

THE NIDIFICATION
OF
BIRDS OF THE INDIAN EMPIRE

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BY

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VOLUME III.

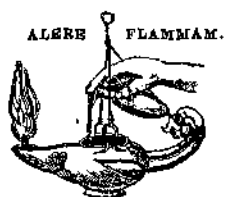
PLOCEIDÆ—ASIONIDÆ.

WITH EIGHT PLATES.

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PREFACE.

THE present volume, the third, contains the remainder of the *Passeres* and the various suborders and families of birds included in the Order *Coraciiformes*, the whole of which are now considered by many systematists to constitute one order—*Pico-Passeres*. It deals with all those families in vol. iii of the 'Avifauna' commencing with the Weaver-Birds (*Ploceidae*), and with all those in vol. iv.

As in the previous volumes, the serial number given to each bird is the same as that given in the 'Avifauna,' this being done to facilitate reference to that work. As regards the nomenclature, this also is that of the 'Avifauna,' corrected in accordance with the Addenda and Corrigenda given in vols. vii and viii of that work, and with the addition of the subspecies described since those volumes were written.

The total number of species and subspecies enumerated in these volumes of the 'Avifauna' was 696, to which 8 additions have since been made, making a total of 704. Of these, the nidification of 545 species and subspecies are now recorded. The nidification is also known of 61 species which breed outside the area of the present work, and, finally, of no less than 92 nothing has yet been recorded.

It must be noted, however, that even of those included in the 545 birds of which something has been recorded the information is often very meagre and, in a few cases, still has to be confirmed, while in one or two the only reference is to an oviduct egg.

I am again indebted to Colonel R. H. Rattray and to Captain R. S. P. Bates for the beautiful photographs which illustrate this volume.

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6 Harold Road, S.E. 19.

4th April, 1934.

LIST OF PLATES.

(From photographs by Colonel R. H. Rattray and
Captain R. S. P. Bates.)

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THE NIDIFICATION OF BIRDS OF THE INDIAN EMPIRE.

Order PASSERES (*cont.*).

Family PLOCEIDÆ.

Subfamily PLOCEINÆ

(WEAVER-BIRDS).

(1008) *Ploceus philippinus* (Linn.).

THE BAYA.

Ploceus philippinus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 67.

The Baya is found over the whole of Ceylon and India, to Sind in the West and to the Himalayas in the North. East it extends to Nepal, the Sikkim Terai and West Bengal. In Nepal and Sikkim this Weaver-Bird and *Ploceus atrigula* overlap for a great stretch of country and I retain them as separate species.

The Baya may be found in any kind of country other than heavy forest or the bleakest of deserts, and in provinces like Sind and Rajputana they will only be found in the better watered and cultivated parts. Of human habitations it has no fear, breeding freely in gardens, compounds and all round and in villages, their nests often hanging from trees shading huts and houses. On the other hand colonies may be found built on single trees, or groups of trees, standing in wide expanses of rice or other cultivation. In the plains of India undoubtedly the birds prefer palm-trees of various kinds as sites for their nests and, failing palm-trees, they often make use of bamboos. At odd times, however, all kinds of trees are built on, though they seldom select trees with dense foliage such as Banyan, Peepal etc. I have seen colonies of nests on Tamarind, many species of Acacia, Neem, Casuarina

and many other kinds of trees, in some cases even when palms or bamboo-clumps were quite handy. As a rule the trees selected are fairly lofty and the nests some 15 to 30 feet from the ground, but Ticehurst records one very curious site (Ibis, 1922, p. 643) :— "One colony consisting of fifteen nests was situated in a 'Kandi' growing out of the inside of a well, and all the nests were below the level of the ground." The birds seem to like trees or bamboos which hang over water, whether this be stream, pond or well, perhaps because it may possibly afford them some additional protection from their numerous vermin enemies.

The colonies vary greatly in size; usually the nests may number anything from a dozen to fifty, while many are far larger and very few smaller. Ticehurst records an instance of only two nests being built together and I, myself, have seen two little colonies of five and six nests respectively, but such are rare. The largest colony of which I have heard was one in Behar of about 150 nests, built on a clump of about a dozen small Babool-trees, standing in an indigo-field.

The nests are wonderful works of art. In shape they are rather like one-sided pears with a long tubular entrance from below—Jerdon calls them "Retort-shaped." The birds commence to build by fastening very firmly their first pieces of material to the support from which they are to hang. They then continue this work downwards, forming the elongated pear-neck, which is lightly built but not hollow. As the neck of the pear widens to some three or four inches it becomes hollow and commences to bulge out in retort-shape. When this reaches its widest part a tie, or loop, of twisted material is built across it and from below this tie is completed the cup which forms the egg-chamber, after which the further wall of the retort is brought straight down to the level of the bottom of the chamber. In some nests this formation of the cup finishes the work; the little Weavers pop in through the hole left below and then over the tie into their nesting-chamber. In most nests, however, the entrance to this chamber is prolonged into a tube which may be only an inch or two in length or which may be over a foot or eighteen inches. Both birds work at the construction of the nest, and the manner in which they work is well described by Mr. Horne ('Nests and Eggs,' vol. ii, p. 118) :— "It was pretty to see a little bird fly up with a tiny bit of grass in his beak. He would sit outside the nest, holding on by his claws with the grass under him. He would then put the right end into the nest with his beak, and the female inside would pull it through and put it out for him again, and thus the plaiting of the nest went on. All this was done amidst tremendous chattering, and the birds seemed to think it great fun. When a piece was used up one would give the other a peck, and he or she would fly off for more material, the other sitting quietly till the worker returned.



NESTS OF WEAVER-BIRDS (*PLOCEUS PHILIPPINUS*).

"Noticed to-day how the birds obtain their grass. The little bird alights at the edge of the high strong sarpat grass (*Andropogon euripeta*?) with its head down, and bites through the edge to the exact thickness which it requires. It then goes higher up the same blade of grass, and having considered the length needed then bites through it again. It then seizes it firmly at the lowest notch and flies away; of course the strip of grass tears off and stops at the notch. It then flies along with the grass streaming out behind."

Sometimes a second nest is attached to the bottom of the first by another pair of birds; in such cases the junction of the two nests being hollow and allowing free passage to the pair of tenants of the "upper flat." In some instances, however, the second nest closes the entrance to the upper one, which has then to be abandoned. Interesting notes on such nests are given by Prater (*Journ. Bomb. Nat. Hist. Soc.* vol. xxxv, pp. 681-3, 1932), and here also he gives a sketch of three nests woven together, but all three with entrances open. The nests are made of strips of blades of grass or reeds, fibre, jute or coir, and Hume says that he has seen nests made entirely of the latter material and that these are the most handsome nests of all. In Ceylon Phillips says that many nests are made of rice-straw. There is no lining. Inside almost every nest will be found little lumps of mud attached to the walls, probably to weight the nests and make them steadier in a wind. The natives, however, have a far prettier reason for the lumps and say the birds put them in as candlesticks and then catch fireflies which they stick in the mud head first with the glowing tails outside to serve as candles.

The male birds are indefatigable in building and often continue to build nests long after their mates have begun to sit on the eggs, though, as soon as these hatch, he drops building and helps to feed the young with soft insects etc. I do not think he ever helps with incubation though he often sleeps inside the nest with his wife and family or in one of the half-finished nests he has occupied his time with previously.

The breeding season is from April to August but in the drier areas the birds often do not commence to breed until the rains break in June, and they may then continue to lay up to the middle of September. In Kanara Barnes, Davidson and Vidal all took nests with eggs in April, and Bourdillon took many in Travancore in May and thence onwards to August.

Over the greater part of India two is the number of eggs almost always laid but, in the North, three, four and even five eggs are not uncommon, and I have seen a colony in which three eggs formed the smallest clutch. Curiously, also, in Ceylon, where birds usually lay very small clutches, this Weaver-Bird lays from three to five eggs.

The eggs are a pure unspotted white with a hard but rather coarse texture and no gloss. In shape they vary from a rather broad oval to a moderately long oval, very seldom at all pointed.

One hundred eggs average 20.3×14.5 mm.; maxima 22.3×15.0 and 21.9×15.2 mm.; minima 18.9×13.7 mm.

Hume gives an extraordinary instance of this Weaver's tenacity in sitting. He writes:—"One day driving out during the rains at Mynpoorie, my eye was caught by a particularly fine nest hanging from a Keekur-tree. I made one of my people climb the tree and bring the nest carefully down. The nest was laid at the bottom of my wagonette and on our arrival home was hung from one of the antlers of the many stags' horns that adorned my dining-room. Three days later, taking it down, I found a female Baya dead upon two half-hatched chicks." It may have been, however, that mother and chicks were dead when Hume took the nest.

(1009) *Ploceus megarhynchus* Hume.

THE GOLDEN-CHINNED BAYA.

Ploceus megarhynchus, Fauna B. I., Birds, 2nd ed. vol iii, p. 69.

This Weaver-Bird was described by Hume from a bird obtained at Kaaladingie, Kuman Terai, and was afterwards obtained by Jamrach from, according to Finn, "somewhere in the Eastern Himalayas." From that time until O'Donel discovered a colony breeding in the Buxa Duars no one ever saw it. It is probably a bird which breeds in the Sub-Himalayan Terai from Kuman to Bhutan, at heights somewhere below 4,000 feet, at which elevation O'Donel found a colony breeding in 1912, collecting some specimens which he sent to the Bombay Museum.

In letters to me O'Donel says that he discovered the colony breeding in a vast area of grass, more or less intermixed with scrub, and that the nests were untidy balls of grass-strips, far more like the nests of *P. manyar* than those of *P. philippinus*, and that none of them had tubular entrances. They were larger than those of *manyar* and were affixed to the stems of the grass, generally to several of these, loosely and carelessly put together and with no lining. The colony consisted of at least twenty pairs but seems to have been rather scattered.

The only eggs known are some laid by Jamrach's birds in captivity on the 19th September, 1901. They are, of course, white and just like other *Ploceus* eggs, and measure between 20.0×14.4 and 22.8×15.1 mm.

O'Donel was, unfortunately, never able to visit this colony again, and no one has since 1912 seen this bird in its breeding haunts.

Ploceus atrigula.**THE FULVOUS-BREASTED BAYA.**(1010) *Ploceus atrigula atrigula* Sharpe.**THE EASTERN BAYA.***Ploceus passerinus passerinus*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 70.*Ploceus atrigula atrigula*, *ibid.* vol. viii, p. 651.

The Eastern Baya occurs throughout the lower hills of the Himalayas from Nepal, and possibly Garhwal, to Eastern Assam, Eastern Bengal and the whole of Northern Burma as far South as Tounghoo and Karenni. In Assam and, so far as I know, in all its Indian habitat, this Baya hardly ever builds its nests in the thatch of houses, but in Burma it does so occasionally, though not so frequently as does the Southern form.

In Assam, although colonies may be found breeding on many kinds of trees, the favourite nesting sites are undoubtedly bamboos and, next to these, palm-trees. The only two nests I ever saw hanging from a thatch roof were two which had been crowded out from a colony building on some palm-trees almost touching the thatch.

Very often these Weaver-Birds will breed on bamboos already occupied by Herons, Egrets and Cormorants, and live in perfect harmony with these, though one would imagine the endless twittering and fussiness of the Weavers would have proved very annoying to the Herons. The colonies generally number some 40 or 50 pairs of birds, but I have seen all sizes from half-a-dozen up to 150 nests.

These latter are in every way exactly like those of the common Indian Baya and need no separate description.

The breeding season everywhere is from April to August, but in most places the vast majority of eggs are laid after the rains break in June. In the wetter countries, such as Assam, the eggs are laid as freely in May as in June.

The full clutch numbers from two to six. In Burma the birds in many colonies, according to Harington, never produce more than two in a clutch; in Assam three or four forms the normal number, though I have often seen five and once six eggs in a nest; nor do I think, as Hume suggests, that the bigger clutches are laid by two birds, as their shape often practically proves the contrary.

The eggs are white and are typical Baya's eggs in all respects.

One hundred average 21.6×14.7 mm.; maxima 23.1×14.9 and 21.7×16.9 mm.; minima 20.2×14.7 and 21.8×14.2 mm.

(1011) *Ploceus atrigula infortunatus* Hartert.

THE MALAY BAYA.

Ploceus passerinus infortunatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 71.
Ploceus atrigula infortunatus, *ibid.* vol. viii, p. 651.

This Southern race of *Baya* extends South from the range of the last subspecies, through the Malay States, to Sumatra and Nias. It is the form found over nearly the whole of Siam except, perhaps, in the extreme North.

Its nidification is exactly like that of the preceding bird and it breeds freely both on roofs of houses and in bamboos and trees in the same way as does that bird.

Jerdon, as quoted by Hume, says :—"In some parts of Burma, and more particularly in Rangoon, the Bayas usually select the thatch of a bungalow to suspend their nest from, regardless of the inhabitants therein. In the cantenments of Rangoon very many bungalows may be seen with twenty, thirty or more of these long nests hanging from the ends of the thatched roof; at one house in which I was an inmate a small colony commenced their labours towards the end of April, and in August, when I revisited the Station, there were above one hundred nests attached all round the house."

Many other collectors in Burma have described to me similar colonies, and one told me that in a house in which he was living the birds' nests hung so low everywhere, except over the main steps, that one had to be careful jumping on and off the verandah not to hit against them.

Herbert, in his account of this bird's breeding, says that they use as material "green threads of fibre, torn from the leaves of suitable water-flags or grasses, or sometimes from plantain-leaves, or even cocconut palm-leaves. The bird alights on the stem of the plant or the leaf and punctures the leaf near the base, he then tears back a piece of the fibre for a few inches, grips the end of it in his beak and flies off to the nest, stripping out the thread for the whole length of the leaf."

All Bayas, I believe, whatever their species, build entirely new nests every year but, as Herbert explains, sometimes there is a climatic change during which all birds stop building and then, when they restart, the green material has all turned yellow and dry and contrasts with the fresh green threads, making the nest look like an old one done up again.

Oates found it breeding in Pegu in April and Hopwood and Mackenzie took many eggs in April and May, but in Siam Herbert says they generally commence breeding in the latter half of May and continue to the end of August. Herbert's and Williamson's earliest and latest dates for eggs of Siam birds are 8th April and

25th August respectively. In Siam neither of those gentlemen ever saw the birds breeding in bungalows.

The eggs are considerably smaller than those of the Northern race. Fifty eggs average 20.0×14.7 mm.; maxima 22.5×14.9 and 21.1×15.4 mm.; minima 19.0×13.5 and 20.1×13.1 mm.

(1012) *Ploceus benghalensis* (Linn.).

THE BLACK-THROATED WEAVER-BIRD.

Ploceus benghalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 72.

This Weaver-Bird is resident and breeds in Northern India from Sind to Eastern Assam and Manipur, while I have recently had it reported from Northern Arrakan, whence, however, I have not seen specimens. Betham found it breeding as far South as Baroda, Wenden obtained nests near Bombay City, and it is common in many places in the United Provinces and very common in Bengal and Bihar. In some places in the Terai it ascends the hills to some height, and Primrose found them breeding freely at 4,000 feet in the Longview Tea Estate near Kurseong in Sikkim.

Unlike the Weaver-Birds whose nidification has already been described this bird makes its nest in bushes or, much more often, in grass and reeds. It does not seem to matter much whether this is long grass in a wayside ditch or grass and reeds in a wide expanse of open grassland. In Cachar and Sylhet I found numerous colonies breeding in the vast expanses of "sun"-grass stretching for miles in every direction. Here the birds bred in smaller and rather scattered colonies broken up into small groups of three to eight pairs, with, perhaps, twenty to forty pairs collected in a radius of 100 yards. Many of these colonies were in grassland quite dry under foot, but most were in damp patches or in grass and reeds actually growing in water. In Lakhimpur several small colonies bred beside the small railway running from the coal-mines at Margherita to Dibrugarh. On either side were lines of borrow-pits from which the railway bank had been made; these, full of water, were overgrown with coarse reeds on which the nests were built, the jungle and forest touching the borrow-pits on one side and the railway the other.

Generally, I think, they prefer wet sites in which to breed and Cripps, in Faridpur, writes of their breeding in hushes on a high bank overlooking a river-bed, while Wenden found them nesting in a small swampy place with water 6 to 18 inches deep.

The nests are like those of the Common Bayas, but have no neck and very seldom tubes of more than an inch or two in length. Some nests have no tubes at all but, rarely, one sees a tube as much as six inches to two feet long. The globular part is not so neatly

woven as those of the pear-shape, nor so tight and compact, but they are quite strong and, nearly always, some of the blades of grass, or twigs of the bushes from which they hang are incorporated in the nest. As usual there is no lining.

The birds breed rather regularly during May and June, but Inglis found a small colony breeding in Tirhut in March and took eggs on the 13th of that month. On the other hand at Baroda Betham obtained many eggs in August.

The eggs in a clutch are generally three or four, though occasionally two only are incubated, and I have seen one or two fives. They are indistinguishable from eggs of other species of this genus.

One hundred eggs average 20.3×15.0 mm. : maxima 22.4×14.6 and 21.8×15.3 mm. ; minima 18.1×13.5 mm.

***Ploceus manyar* (Horsf.).**

THE STREAKED WEAVER-BIRD.

(1013) *Ploceus manyar flaviceps* Less.

THE MADRAS STREAKED WEAVER-BIRD.

Ploceus manyar flaviceps, Fauna B. I., Birds, 2nd ed. vol. iii, p. 73.

The Madras race of Streaked Weaver-Bird extends as far North as Orissa on the East and Bombay on the West, while South it occurs and is common in Ceylon. In Southern India this Weaver-Bird breeds in much the same situations as the preceding species. Col. Butler found them at Milana near Deesa breeding during August and September, where he says:—"As a rule they are fastened to reeds or bushes growing in the water, by the sides of tanks, open wells, or marshy ground, but at the same time it is not unusual to find them in high sarpat grass out in the open country at some distance (a half mile or more) from water. They also often build in long grass overhanging ditches or small streams, and I have occasionally found a small colony building in low, thorny bushes and trees (mimosa etc.) overhanging the water. The nests are almost exactly similar to those of *P. baya*, except that they are slightly smaller, and in some instances the tubular entrance is of immense length. There is one very remarkable thing about this species, and that is a peculiar habit they have of cementing yellow flowers (generally mimosa) to the nest with cow-dung."

As a matter of fact the nest is *not* like that of *P. baya* (= *philippinus*) as it has no neck, the upper part of the nest being rounded with the supporting pendent blades of grass, leaves or twigs worked into the structures of the nest as in *P. benghalensis*. As a rule, also, the tubular entrances are short, sometimes almost absent,

but at other times very long, and I have been told of one nest with a tube of about three feet.

Wait says that this Weaver is common, though local, near or over water in Ceylon, making its nest usually in bulrushes during February and March, while in Travancore Bourdillon found it equally common in the plains but breeding from July to September. In Bareilly also Whympers found them breeding chiefly in August and, except in Ceylon, June to September seems to be the normal breeding season.

The eggs number two to five. Jerdon thought two to be the number most often laid but in most colonies three to four eggs are usual.

They are indistinguishable from other *Ploceus* eggs, and fifty average 20.3×14.3 mm. : maxima 21.6×15.0 and 20.1×15.1 mm. ; minima 19.1×13.9 and 19.2×13.1 mm.

Both birds help in building the nest, but I think that with all Weaver-Birds the female alone carries on the duties of incubation. The males—and these, as with the Bayas, are said to greatly outnumber the females—spend much of their time building, either prolonging the entrance to the nests in which their wives are sitting or in starting new nests which they half build and then desert. Once the young are hatched he is a hardworking careful father, and feeds his young with soft insects, larvæ etc. like all other Weaver-Birds and, indeed, most other Finches.

(1014) *Ploceus manyar striatus* (Blyth).

THE SIND STRIATED WEAVER-BIRD.

Ploceus manyar striatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 74.

This race is found in Sind, the Punjab and the North-West Frontier. Over large areas it does not occur but, wherever there are wide stretches of grass near, or in, marsh or lake, these Weavers may almost certainly be met with.

Its breeding habits, nests and eggs, are just the same as those of the preceding race but, whereas a colony of forty pairs of that bird is exceptional, the present race often collects in very large numbers. Hume says:—"There are places in the Etawab and Mynpooree Districts, and again in Sindh, arid as these localities as a whole are, where, nevertheless, finding suitable rushy, reedy cover, it breeds in great numbers. In one *dhand* in Upper Sindh I found nearly 100 old nests in a small bulrush island not 20 yards in diameter."

Occasionally these Weavers breed in trees, as Colonel Butler says that he once found the nests of *P. benghalensis*, *P. philippinus* and *P. m. striatus* "all in the same tree."

The nests of this Weaver sometimes have very long tubular entrances, often twice as long as the body of the nest; on the other hand many have them very short, two or three inches only, in length.

The breeding season seems to be invariably from the start of the rains, *i. e.*, about the middle of June, to the end of September and, in the same colony, nests may be found with full-fledged young, while there may be other nests only just begun or with fresh eggs.

Twenty-five eggs taken by Hume average 20.7×14.7 mm.

(1015) *Ploceus manyar peguensis* Stuart Baker.

THE BURMESE STRIATED WEAVER-BIRD.

Ploceus manyar peguensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 75.

This Weaver is found in the Himalayan Terai and adjoining plains from Garhwal to East and South Assam and Eastern Bengal. It is resident over practically the whole of Burma and extends East into Siam, Annam and Yunnan.

Generally speaking the nidification of this bird is similar to that of the other races of the species and to that of the Black-throated Weaver-Bird. This subspecies, however, is the one I have personally known best, and there are one or two points I have noticed which it may be as well to record. In the first place I have noticed that, though in shape the nests of all these birds are identical, the Striated Baya attaches it to its supports more firmly, yet incorporates fewer blades or twigs in the walls of the nest. The Black-throated bird when breeding in reeds or grass bends down the heads of several reeds and incorporates at least half-a-dozen or more blades in with the materials of the nest. The Striated Weaver-Bird sometimes uses a single reed, sometimes two and only occasionally three or four; few leaves are bound into the nest and often it is truly pendent from the reed-stems themselves. So, also, when built from a high bush or small tree the nest is firmly attached to a horizontal branch rather than made to hang suspended by several twigs at the tip. The nest is, of course, round and not pear-shaped, having no neck. The tubular entrance is generally short but, exceptionally, long or very long.

Nests taken by myself measured anything between 7 and 9 inches in external depth (exclusive of the tunnel) and between 5 and 7 inches across the widest parts. The tunnel as a rule was 2 to 4 inches in length, but one I measured was over two feet. A very curious structure found in one colony consisted of two nests built back to back with the one wall forming the back to both and with one roof to the two. One of the nests had a tube about 2 inches long, while the other had the entrance-tube about 12 inches.

The birds work very hard at the nests, which take only four to seven days to complete with the exception of the entrance-tunnel, on which the cock bird works while the hen sits.

Display in all Weavers, that I personally know, is the same in character. The cock bird, with drooping, shivering wings, sidles backwards and forwards on the reeds or clinging to the sides of the nest, uttering all the time a low chirruping cry. Every now and then he stops with a little jerk, spreads his tail and flutters his wings and then relapses into the shiver.

The breeding season is from June to August, though in the wetter parts of Assam nests and eggs may be found in May and, everywhere, a few birds continue breeding into September. In Siam Herbert took a clutch of four eggs at Bangkok as early as the 3rd March and another on the 11th September.

The eggs number three or four. I have once seen a five and have several times found five young in a nest.

One hundred eggs average 20.6×14.9 mm.; maxima 22.8×15.9 mm.; minima 18.4×13.7 mm.

(1016) *Ploceëla chrysæa* Hume.

THE GOLDEN WEAVER-BIRD.

Ploceëla chrysæa, Fauna B. I., Birds, 2nd ed. vol. iii, p. 76.

This, the most handsome of all our Oriental Weaver-Birds, occurs in Upper Burma between the Irrawaddy and Sittoung Rivers from Mandalay South to the Gulf of Martaban. It is found in Northern Tenasserim, Siam, Cochin China, Annam and Java.

Oates found these birds breeding in great numbers in the Pegu plains while, later, Mackenzie and Hopwood found them equally common in the same district in and round the village of Yitkangale, 16 miles from Pegu. The colonies seem to vary in size from three or four to about thirty and are most often built either in, or close to, marshy places, ponds or rivers, the sites most often selected being small thorny trees or, less often, rank reeds and grass.

The nests seem to be of two sorts, the first a neat copy of the nest of the Common Baya but with a very short entrance-tube. The second type is very like a Munia's nest. Oates describes this latter form of nest as follows:—"The nest is placed about 5 feet from the ground invariably supported from below and not hanging as is the case with the nests of other Weaver-Birds. It is securely fastened to several stems and leaves of a large species of grass, or to the branches of some strong weed.

"The nest is cylindrical, about 6 inches high and 4 inches in diameter externally, composed entirely of grasses, woven on the outside in a very clumsy manner, the whole exterior presenting a series of loops and sharp angles. The interior is formed of fine

grass, nicely curved to the shape of the nest and perfectly smooth. The flowering ends of these fine grasses are in some nests brought forward so as to form a ring, through which the bird enters the nest. The entrance is at various heights, sometimes in the middle and sometimes quite at the top of the nest. It is about an inch in diameter."

Herbert in Siam first found nests of the pendent kind but says that the more general type is a spherical nest exactly like that described by Oates.

Mackenzie (Journ. Bomb. Nat. Hist. Soc. vol. xxiv, p. 821, 1916) gives a very interesting note on this bird's breeding. He writes:—"The nests were placed from 3 to 12 feet from the ground, generally about 8 or 10 feet. They were mostly built in a thorny bush, locally called 'Kathel,' at the extremities of the branches, supported by the twigs being worked into their structure; the support came indiscriminately from above, below, or all round the nest. I found a few nests (mostly unfinished) in Elephant-grass, but 80 per cent. were in small trees or bushes.

"In all cases the birds had apparently exercised care in the selection of the site. All colonies found in trees (with the exception of 5) were in 'Kathel' or 'Zee,' both of them thorny and most unpleasant to deal with. Of the 5 exceptions, 4 were built in thornless trees which contained hornets' nests, and the fifth was in a tree infested by a very large ant with a fearsome bite. My man had a badly swollen hand as a result of getting eggs from the last colony."

This characteristic of the Golden Baya seeking the protection of ants and hornets has also been noticed by other collectors, and Hopwood in one of his letters to me remarks on the fact that if the nests are in places which appear easy to rifle one may regard it as certain that the tree also contains hornets or huge red ants. Other Bayas, also, sometimes seek this same defence against vermin, and O'Donel (*ibid.*) says that three times he has found the nests of the Common Weaver-Bird with hives of the common Jungle-Bee alongside. I, too, have twice seen Black-throated Bayas' nests in grass round a hornet's nest.

In India and the Indo-Chinese countries the breeding season is from June to September, nearly all eggs being laid in late June and July. In Java the most common month for eggs is May. The normal clutch of eggs, everywhere, is two. Mackenzie puts the number of three-egg clutches as about 5 per cent., but occasionally four are laid, Herbert having taken this number in Siam.

The eggs are very different to those of the genus *Ploceus* and, instead of being white, exhibit a wonderful range of variation. Many eggs are like small eggs of the Meadow-Pipit but, as a rule, the markings are so fine that they cannot be seen even with a magnifying-glass, and the eggs look light grey-brown, buffy-brown or slate-grey. Some have a faintly greenish tinge, a few a

suspicion of lilac or pink. Other eggs have a definite pale grey, almost white, ground, occasionally with the faintest possible freckling of grey, while in others the freckling is more pronounced and in others again almost as heavily marked as some Sparrows' eggs, which they then closely resemble, though the freckles never develop into blotches. I have only seen one pure white clutch. As a rule both or all the eggs in a clutch are of the same colour, but now and then one sees a pair which differ slightly from one another.

The texture is smooth, fine and often has a strong gloss and always a certain amount. In shape they are generally broad, short ovals, some eggs being rather longer and more pointed.

Two hundred eggs average 18.3×13.75 mm.: maxima 26.2×14.1 and 19.0×14.8 mm.; minima 16.1×12.3 mm.

Both sexes take an equal share in nest-building but the female alone incubates. In their fussiness, cheerful chirping and constant energy whilst breeding they resemble the birds of the genus *Ploceus* and, like them, often amuse themselves making odd nests at odd times.

Subfamily ESTRILDINÆ

(MUNIAS).

Munia malacca.

THE BLACK-HEADED MUNIA.

(1017) *Munia malacca malacca* (Linn.).

MALABAR BLACK-HEADED MUNIA.

Munia malacca malacca, Fadna B. L., Birds, 2nd ed. vol. iii, p. 78.

The range of this little Munia still requires some working out. It is common in Ceylon and ranges up to the West coast of India to Ratnagiri and inland in the North to Belgaum.

It breeds practically anywhere in open country, in grass, reeds, less often in bushes, while once its nest was taken from the top of a stunted Coconut-palm. More than anywhere else, however, it makes its nest in sugar-cane fields, and probably at least five out of every six nests will be taken from these.

Colonel Butler took a great number of their nests in Belgaum during August and September, all from sugar-cane fields. Often he found several nests close to one another, once four or five nests containing eggs within a radius of a few yards. The nests were generally built where the cane was thickest and highest, being placed at all heights from 2 to 7 feet from the ground.

He describes one nest as follows (Hume's 'Nests and Eggs,' vol. ii, p. 127) :—"A nest containing six pure white eggs. It consisted of an immense ball of dry grass, coarse exteriorly, fine interiorly and round the entrance, which consisted of a small hole in the centre of the nest upon one side, the whole structure being about the size of a child's head, and was built in the centre of a sugar-cane field, suspended from the tops of the sugar-cane, and not supported from below, as is usually the case with the nests of *Munias*. The sugar-cane was very tall and dense, and the nest, although a large one, well concealed, and probably it would have escaped notice altogether had I not observed the old birds passing backwards and forwards with grass in their mouths."

Some other nests, he adds, differed "in being densely lined with a species of fine green flowering grass, many of the flowering stalks of which protruded round the entrance, the exterior being composed of coarse, broadish blades of dry reeds."

In Ceylon Phillips found them building their nests in coarse grass in swamps, and two other nests sent to me from Colombo were both built in bushes in the Cinnamon-gardens. In Travancore Stewart obtained the nest in grass-fields, but the birds were not common, the greater part of the hills being too heavily forested for them.

They breed principally after the break of the rains in July, August and September, but I have eggs from Ceylon taken in April, June and October, while Davidson obtained a clutch in Kanara on the 4th March.

The eggs in a full clutch vary from five to seven, generally six. They are white, like all *Munias*' eggs, the texture very smooth and soft but quite glossless and the shells decidedly fragile. In shape they are rather long ovals, some eggs being decidedly pointed.

Fifty eggs average 16.3×11.5 mm. : maxima 17.1×11.5 and 16.5×12.2 mm. ; minima 15.5×10.8 and 15.6×10.6 mm.

(1018) *Munia malacca orientalis* Stnart Baker.

THE MADRAS BLACK-HEADED MUNIA.

Munia malacca orientalis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 79.

The Eastern form of Black-headed Munia occurs throughout the Madras Presidency as far North as the Central Provinces and West to Coorg, Nilgiris and other hill ranges of Mysore, but not ascending these to any great elevation.

In its breeding habits it differs in no way from the preceding bird, and Jerdon, who took many nests, describes them as exactly like those of the Malabar bird. Theobald says that in the Coimbatore district he found nests in October built in reeds growing in a small pond :—"They were round, with a round hole on one side for an entrance, and were composed of dried reeds and leaves

of some flag-leaved grass very like those of the chobum (*Sorghum vulgare*). The lining was composed of the hair-like filaments from the broom-grass of this country. Seven is, I think, the full complement of eggs."

Blewitt gives the measurements of nests found by him in Bhanara as 6 or 7 inches in diameter.

They breed from July to October as a rule, but Sparrow took eggs in the Deccan in April.

Twenty eggs of this race which I have been able to measure average 16.0×11.2 mm.: maxima 16.8×11.9 and 16.3×12.0 mm.; minima 14.8×11.0 and 15.0×10.3 mm.

Munia atricapilla.

THE CHESTNUT-BELLIED MUNIA.

In 1924 (Journ. Siam. Nat. Hist. Soc. vol. v, p. 362) Robinson and Kloss restricted the type-locality of this Munia to "Lower Bengal," but Hodgson (As. Res. vol. xix, p. 153, 1836) named the bird from Nepal, which is the same as the Bengal bird, *rubroniger*, by inference declaring that the typical bird came from somewhere else. Under these circumstances it seems impossible for Robinson and Kloss to restrict the type-locality of *atricapilla* to a place inhabited by *rubroniger*. Sharpe also, in Cat. Birds B. M., definitely assigns *atricapilla* to the Southern birds and *rubroniger* to the Northern. This alone would invalidate Robinson and Kloss's "Lower Bengal" for *atricapilla*. I do not, therefore, alter my distribution of these Munias given in the 'Fauna.'

(1019) Munia atricapilla atricapilla Vieill.

THE MALAY CHESTNUT-BELLIED MUNIA.

Munia atricapilla atricapilla, Fauna B. I., Birds, 2nd ed. vol. iii, p. 80.

Following my distribution given in the 'Fauna,' this Munia is found over the whole of Burma and Siam roughly South from about the latitude of Rangoon on the West and Samkok on the East; the Malay States to Singapore.

Birds North of this area are somewhat intermediate until one comes to the Arrakan Yomas, Chin, Kachin and Bhamo Hills, where one gets quite definitely the big, black-bellied bird.

This little Munia generally breeds in long grass or reeds in moist ground round villages or in the long grass growing on the banks between rice cultivation. It, however, by no means restricts itself to reeds and grass, and will often make its nest in bushes, palms and small trees and, like many other Munias and Bayas, it seems to prefer those well armed with thorns. In Siam Herbert says

that he took one nest built in the very prickly Ribbon-leaved Water-palm; in Tenasserim Macdonald took the nest in thorn-bushes, as did Hopwood near Mergui. I have no records of its breeding in jungle, as does the Northern race.

The nest is a very large ball of rather loosely woven grass or strips of blades, gathered green, and lined with finer stems or strips of dried grass. The entrance varies a good deal. Davison speaks of one nest taken by him near Mergui as being about 7 inches in diameter and having an entrance $2\frac{1}{4}$ inches wide. Other nests have a much smaller entrance, and in few is it built of the flowering ends of grasses which stick out in all directions, and which are so often made use of by other Munias.

Sometimes the nests measure as much as 8 inches and seldom as little as 6 inches in diameter, while in shape they are fairly true spheres, not ovals.

They may be placed at any height between two and fifteen feet, but most will be found between three and five feet from the ground.

The two principal months for breeding are June and July, but nests with eggs may be taken as late as September. In Tenasserim Mackenzie, Hopwood and Macdonald took all their nests with fresh eggs between the 21st June and the end of July.

The eggs are, as usual, white, smooth and fragile-shelled, without gloss.

Since the 'Fauna' was written I have been able to measure the eggs taken by Mackenzie and others in Tenasserim and, on the other hand, have eliminated eggs sent from the Southern Shan States, which are those of birds nearer *rubronigra*.

Sixty eggs average 15.7×10.9 mm. : maxima 17.8×12.0 mm. ; minima 14.2×10.5 and 15.0×10.3 mm.

(1020) *Munia atricapilla rubronigra* Hodg.

THE NORTHERN CHESTNUT-BELLIED MUNIA.

Munia atricapilla rubronigra, Fauna B. I., Birds, 2nd ed. vol. iii, p. 81.

The Northern race of this Munia is found as far West as Sambalpur, thence all along the Himalayan Terai to the extreme East. In the plains it extends into Bihar and Bengal North of the Ganges. In Burma it is found all over the plains and lower hills of the North about as far South as the central Arrakan Yomas and Karenni. East it extends into Yunnan, North Siam, Annam and South-West China.

In Assam this is a common bird up to about 3,500 feet, but extends sometimes much higher, and I have taken its nest at 4,500 feet more than once.

In its nidification it resembles the previous bird, but it is sometimes found in scrub-jungle and even in bushes in forest. At the same time it undoubtedly prefers the vicinity of villages and cultivation and breeds in gardens of houses on Tea Estates. It also more frequently places its nest on trees and bushes than does the preceding race and is less exclusively a grass-breeder. I have taken its nests in bushes beside jungle tracts, in beans and other creepers growing over huts in cultivation, on trees in the open thirty feet from the ground and in coarse tufts of grass only a few inches above it. There seems to be little attempt at concealment; the nest *may* be built well inside a bush with dense foliage but it is more likely to be built in a branch with few leaves, conspicuous from far away. The nests bear a very rough, unfinished appearance and are much larger than seems necessary. I have taken them measuring as much as 10×8 inches and they are seldom under six inches either way.

The breeding season everywhere is from the middle of June, when the rains break, to the end of September. A few eggs may be taken both earlier and later. Thus Scully says in Nepal they breed from May to the end of October; I have myself taken a few eggs in both of these months in Assam, while in the Botanical Garden, Calcutta, where it is very common, eggs have been taken from late June to November.

The normal full clutch is five or six eggs, one as often as the other; sets of seven are rare but four only are often incubated.

Sixty eggs average 16.3×11.5 mm.: maxima 17.8×11.9 and 17.0×12.2 mm.; minima 14.9×10.2 mm.

Both sexes take part in incubation and both assist in building the nest and, after the young are fully fledged, both parents and young continue to use the nest for roosting purposes until the walls give way under the strain. While incubation is going on both male and female sleep in the nest and, even in the day, both may sometimes be found inside it.

Uroloncha striata.

THE WHITE-BACKED, OR SHARP-TAILED, MUNIA.

(1021) *Uroloncha striata striata* (Linn.).

THE SOUTHERN WHITE-BACKED MUNIA.

Uroloncha striata striata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 83.

This White-backed Munia is very common in Ceylon at all heights up to 4,000 feet and extends over the South of India up North as far as Bombay, Sambalpur and Manbhum in Bengal and Orissa.

This is a bird of both civilization and jungle, although Miss Cockburn says that in the Nilgiris they "are very shy, never approaching any house." Jerdon, on the contrary, says:—"In Malabar it is a familiar bird, being constantly seen on the roadside, about houses and in stable-yards, and it builds in gardens and orchards." Vidal says in the South Konkan it is "common everywhere in gardens and jungles."

Bourdillon considers it more of a jungle than a garden bird, and says that in preference it haunts "scrub jungle and scattered bush in the low country at the foot of the hills," though it may also often be seen in the vicinity of villages. In Ceylon also Wait describes it as "more of a jungle-bird than *U. punctulata*."

The nest is sometimes built in grass and reeds or sometimes in high trees, while most are placed in fairly thick bushes, often thorny ones, at any height from a few inches to five or six feet above the ground. In Ceylon Phillips found them often breeding in rubber trees about ten feet up, while Wait says that they often place their nests "in the end of low branches of trees round jungle tanks." Like most nests of *Munias*, no attempt is made to conceal it and its large size cannot but make it conspicuous.

In shape it is the usual football and the birds approve both of the "Rugger" and "Soccer" shape, it being sometimes oval, at others spherical. In size it varies from about 7 by 5 or 6 by 6 inches to at least 2 inches more each way. It is made of shreds of grass and reed-blades, very coarsely and roughly put together, sometimes lined with rather finer grass and grass-stems, but often with no real lining at all. The entrance, an untidy hole between 2 and 3 inches wide, may be anywhere except at the bottom of the nest, and is very untidy, badly finished and roughly shaped.

The most popular breeding season is from June to September but eggs may really be taken almost any month of the year. From Ceylon I have eggs taken from February to September but Betham took eggs in Bombay in November. In Travancore Stewart and Bourdillon obtained eggs from May to August, but both say that odd nests with young or eggs may be found in any month.

The clutches are large and Miss Cockburn, Darling and Bourdillon all speak of clutches of eight eggs, and I have some of this number in my comparatively small series. They are quite typical *Munias*' eggs.

One hundred eggs average 15.3×10.7 mm. : maxima 16.8×10.9 and 16.7×12.2 mm. ; minima 13.5×10.6 and 14.1×9.9 mm.

(1022) *Uroloncha striata fumigata* Walden.

THE ANDAMAN WHITE-BACKED MUNIA.

Uroloncha striata fumigata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 83.

This Munia is restricted to the Andamans, where nests with eggs were taken by Osmaston and Wickham. A series of eggs sent to me by the former were accompanied with the following notes:—

“This little bird breeds all round Port Blair during May and June in considerable numbers both in the open and in thin scrub and small tree jungle. The nest is generally placed about six or seven feet up in small thorny trees or bushes and is of course, from its size and conspicuous position, very easy to find. It is a large, almost spherical ball made of fine grasses and lined with fine flowering grass-ends and there is no attempt at neatness or finishing off, the outside being a mass of tangled ends and the entrance obstructed with the flowering ends projecting all round the hole, which is itself badly rounded off and loosely formed.

“The birds lay from five to seven eggs and all my nests have been taken in the latter half of May to the end of June.”

It is possible, however, that the breeding season is a good deal longer than this, as Davison saw young which had recently left the nest in December. Davison also refers to a feature in the nest not mentioned by Osmaston and, perhaps, not always in evidence. He says “the entrance is placed at one side and drawn out into a short neck—in fact very similar to those of *S. amandava*.”

Forty eggs average 15.2×10.8 mm.; maxima 16.2×10.4 and 14.9×12.0 mm.; minima 14.2×10.4 and 14.0×9.9 mm.

(1024) *Uroloncha striata acuticauda* (Hodgs.).

THE HIMALAYAN WHITE-BACKED MUNIA.

Uroloncha striata acuticauda, Fauna B. I., Birds, 2nd ed. vol. iii, p. 84.

The Himalayan form of White-backed Munia extends all through the Sub-Himalayan Terai between the foot-hills and 4,000 feet from Garhwal to Eastern Assam. Thence it is found throughout Northern Burma to the South Shan States and Northern Siam.

This is a very common Munia in Assam, breeding from the foot-hills up to 5,000 feet but most numerous between 1,500 and 3,000 feet.

The birds breed both in open country, light scrub-jungle, secondary growth and even in the interior of deep humid forest. One of the first nests I ever took was taken at nearly 4,000 feet in the warm, humid valley of the Laisang River, built in a low bush beside a foot-track leading from one village to another, and at least half a mile from any open space. The trees were very lofty but there was much green undergrowth. A very favourite site is a cotton-bush, or other low bush growing in cotton-fields

which are surrounded by forest; the light growth which springs up the first year cultivation is abandoned is also often built in, while I have seen nests situated in orange and other fruit-trees in my garden and orchards, though this is rare. Hodgson says that they sometimes place their nests "either among the spiny leaves of the palm-trees or the thick interlaced branches of the lesser bamboos." Other birds sometimes make their nests low down and well inside the clumps of the giant bamboo. The most unusual site recorded was one taken by Irwin in Hill Tippera "composed of fine grass-stems placed in a half-open hole in a low bank."

As a rule the nest is placed low down between three and four feet from the ground, but I have found some in brambles a few inches above it and others as much as 20 feet up in small trees, bamboo-clumps etc.

The nest is the usual untidy ball of grass, measuring anything between 5 by 5 inches to 10 by 10 inches when round and between 6 by 4½ to 10 by 7 inches when oval. Personally I have never seen anything but grass used in their construction except a few bamboo-leaves incorporated in the base of the nests built in bamboo-clumps. The grass used is very fine, often stems with the flowering ends attached which are not thicker than a needle, the ends sticking out everywhere and projecting from the loosely built round entrance, so far all round that they sometimes form a rough tube.

Hodgson says that "the nests are composed of grass, fibres or the leaves of *Pinus longifolia*"; Gammie says of the nests found by him in Sikkim that the outside was of coarse grass, the inner of fine, and of one he writes that bamboo-leaves were mixed with the grass. The materials are very loosely interwoven and, as a rule, do not embrace the supporting twigs, the nest being carelessly pushed in among them; there is no regular lining, the fine grass-ends being used both inside and out, the flowering ends protruding from the entrance. I have seen more than one nest in which it was difficult to say really which was the entrance, the birds apparently forcing their way through the side where it was most loosely woven. I have seen nothing similar to this in the nest of any other *Munia* or, indeed, of any other bird.

The breeding season is principally from the middle of May to the end of August, but eggs may be found in almost every month of the year. I have taken fresh eggs from the 3rd March to the 30th September and Gammie saw half-fledged young in November.

The eggs number five to seven in a full clutch.

One hundred eggs average 15.3 × 10.9 mm.: maxima 16.9 × 11.0 and 15.5 × 11.5 mm.; minima 13.1 × 10.4 and 14.5 × 19.9 mm. A pigmy egg in a clutch of seven measures only 9.9 × 7.3 mm.

Both birds build the nest, which takes anything from four to eight days to construct, according to whether the hen is ready to lay or not. Both birds also incubate, very often in company, for the ten days required, and both feed the young. These, however,

are not fed, as Hodgson and Gammie thought, with grain and seeds, but with soft insects. A pair I watched were bringing in practically nothing but tiny little green caterpillars and a few spiders. After the young are fledged they and their parents use the nest for a long time for sleeping in.

I have often seen this *Munia*, as well as other species, collecting material for their nests and all seem to work in the same way. First they nip through a blade or stem of grass to the depth and width desired and then work up a small bit sufficient to give them a good hold with the beak; this obtained, they give it a quick jerk and fly straight up, stripping the shred for some inches up the stem or along the leaf. By another species of *Munia* some patches of lemon-grass in my garden were annually almost destroyed in this way by the birds, but their nests, built in the trellis of my verandah, were very sweet-smelling little homes.

(1025) *Uroloncha striata subsquamicollis* Stuart Baker.

THE MALAYAN WHITE-BACKED MUNIA.

Uroloncha striata subsquamicollis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 86.

This *Munia* occurs within our limits over the whole of Burma South of Tounghoo, and thence to Singapore and Sumatra. East it extends through the Southern half of Siam into Cochin China, Annam, Hainan and Formosa.

Although it is so common a bird over a great part of Burma, I can find nothing recorded about it breeding beyond Davison's note in Hume's 'Nests and Eggs,' where he says:—"This species is a very irregular breeder or it has several broods in the year. In November it was not only breeding, but there were many full-fledged young about, usually in small parties without any admixture of adults; and now in June there are still young to be found that have not long left the nest, and nests are to be found containing eggs, both fresh and hard-set, while other nests are in course of construction.

"The species is very plentiful and breeds freely, resorting to gardens or low secondary scrub for the purpose, and never, to my knowledge, to grass or rushes.

"Usually the nest is placed at a moderate elevation in some bush—a thorny one for preference.

"On the 20th June I took a nest with five fresh eggs from a small citron-tree. It was rather compactly put together, composed on the outside of dead leaves and coarse grass, and thickly lined with fine flowering grass-stems, the ends of which projected beyond the entrance, forming a short neck.

"The nest measured about 9.5 inches along its major axis, about 5.5 along its minor axis."

The only eggs I have seen measured 14.9×10.2 to 15.3×10.9 mm.

(1026) *Uroloncha striata squamicollis* Sharpe.

THE CHINESE WHITE-BACKED MUNIA.

Uroloncha striata squamicollis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 86.

The Chinese race of White-backed Munia only enters our territory in the Eastern Shan States, but occurs in North Yunnan and Western and Southern China.

It has not yet been found breeding within our limits, but Messrs. Vaughan and Jones found it breeding freely in South China. They write (Ibis, 1913, p. 176):—"At Canton, Macao and on the West River it is a common breeding species, and builds its nest in a variety of situations, often in a fir-tree, sometimes quite low down, or in a bamboo, or, again, high up in a hanyan or bombax tree at an elevation of perhaps 40 to 60 feet. In a large tree the nest is frequently placed at the extremity of a small bough, and in such a situation is very difficult of access. Empty nests are used for sleeping in, in the cold weather, and the birds were seen building a nest in January which was used as a sleeping place."

"Five or six eggs are laid, from early in April until September, and sometimes even later. Seven is not very infrequently the clutch early in the season."

Thirty-four eggs taken by Messrs. Vaughan and Jones average 16.7×11.7 mm.; maxima 17.9×11.6 and 17.2×12.0 mm.; minima 14.9×11.0 and 15.0×10.5 mm.

Uroloncha leucogastra.

THE WHITE-BELLIED MUNIA.

(1027) *Uroloncha leucogastra leucogastra* (Blyth).

THE MALAY WHITE-BELLIED MUNIA.

Uroloncha leucogastra leucogastra, Fauna B. I., Birds, 2nd ed. vol. iii, p. 87.

The range of this Munia is from the South of Tenasserim to Singapore and Borneo.

The only record of its breeding is, once more, that of Davison, who took one nest in Tenasserim, which he describes as follows ('Nests and Eggs,' vol. ii, p. 135):—"On the 25th April last I took a nest of this species in dense forest between Malawoon and Bankasoon, and about six miles from the nearest open ground."

"The nest was a globular structure about 7 inches long by about 6 inches wide at the broadest part, and was composed of dry grass and bamboo-leaves, and lined with finer grass-stems and a little fibre, and placed in the fork of a sapling about seven feet from the ground."

Kellow sent me a fine series of the eggs from Taiping with the following note :—"The nests were quite typical *Munias*' nests, domed affairs of fine grass, strips of grass and grass-bark and flowering grass-ends. There was no special lining in any of them and they were very loosely and roughly put together. They were taken from bushes between three and six feet from the ground and all in forest in the vicinity of villages."

Hopwood took a nest near Tavoy in a similar position, in similar forest.

The breeding season, so far as we know, is March to May. Kellow's nests were obtained between the 16th of March and the 24th May, Hopwood took his on the 27th April and Davison his on the 25th of the same month.

Forty eggs average 15.5×11.5 : maxima 16.8×12.1 and 16.1×12.2 mm. ; minima 14.6×10.9 and 15.0×10.6 mm.

(1028) *Uroloncha jerdoni* Hume.

THE RUFOUS-BELLIED MUNIA.

Uroloncha rufiventris Fauna, B. I., Birds, 2nd ed. vol. iii, p. 88.

Uroloncha jerdoni, ibid. vol. viii, p. 651.

This little *Munia* is confined to the South-West of India from the Wynaad to the South of Travancore, being found both in the plains and in the lower hills. In the Nilgiris they ascend about as high as Kotagerry, where Miss Cockburn obtained many nests, and in Travancore they apparently are to be found at all elevations.

They are very confiding little birds in the Nilgiris, breeding in gardens and houses, but in Travancore Bourdillon and Stewart both record them as breeding either in forest or in the open.

Their nidification is very different to that of most *Munias*, for, though they make a nest which is the typical grass ball, they place them in very different situations. Some are built in the thatch of bungalows, others in, or partly inside, holes of trees and others on big boughs and branches of large trees.

Miss Cockburn, writing from Kotagerry, says :—"These little birds build in July and, like all of this species, construct a large nest. Many of them built in the eaves of a coffee store-house, which was thatched, attaching their nests to the thatch so far in as almost to be hid.

"The nest (sent) was found in a coffee estate, about 3,000 feet of elevation.

"The situation chosen was a large tree in front of the coffee godown on the side of a hill. The nest was built on one of the large outer branches, slightly concealed among the leaves, at the height of about twenty feet. The shape was perfectly round, about 7 or 8 inches in diameter. It had been commenced with long dried

roots, to which was added the long leaves of a reed which grows near water. These leaves are from 3 to 4 inches long and about 1 inch broad. A large quantity of fine, soft, down grass-seed ears were accumulated, forming a completely round nest, with a small hole at one side; no lining. The number of eggs 8 or 10. Only one brood is reared here, during the two or three months the birds remain here."

Bourdillon describes the nests taken by them in Travancore as "a large loose construction of fine creeping-grass, with, perhaps, a few feathers interwoven, deposited in a hollow stump, and contains 6 to 8 eggs, laid about June or July."

Finally, Stewart, who took many nests, describes them as similar to those found by Miss Cockburn, but placed either in holes or in forks of the boughs of trees. No nest found by him had any feathers among the materials used. The breeding season is much longer than Miss Cockburn thought, for though many birds breed in July, I have eggs taken as early as the 11th April and others obtained on the 17th August.

Thirty-six eggs, including those referred to in Hume's 'Nests and Eggs,' average 16.0×11.5 mm.: maxima 17.8×12.0 and 17.5×12.2 mm.; minima 15.0×10.5 mm.

(1029) *Uroloncha kelaarti* (Blyth).

THE CEYLON MUNIA.

Uroloncha kelaarti, Fauna B. I., Birds, 2nd ed. vol. iii, p. 89.

This Munia is confined to Ceylon, where it is common between 2,000 feet and the highest peaks, occurring but rarely at the former elevation.

Wait ('Birds of Ceylon,' 2nd ed. p. 119) writes:—"It is found deep in hill forests as well as in gardens or estates. The breeding season is from May to December.

"It frequently places its nest among the bushy creepers growing on the walls and verandahs of up-country hungalows, but it also breeds in forest trees or bushes. The nest is of the usual globular type."

Jenkins, near Hepatdale, and Phillips, round Gammaduwa and Matagama between 3,000 and 4,000 feet, obtained for me a fine series of eggs taken from nests built in trees and bushes growing in rubber and tea estates, often, in fact, in tea-bushes and rubber-trees, as well as in the forest. As a rule these were placed between four and seven feet from the ground. The nests were the usual round balls made entirely of grass and lined with fine grasses.

Wait gives the breeding season as May to December, but I have several clutches of eggs taken in March and April, and this

little *Munia*, like so many others, probably breeds more or less all the year round, having two or three broods yearly.

Sixty eggs average 15.8×11.35 mm.: maxima 18.0×11.8 and 17.7×12.1 mm.; minima 14.2×11.0 and 17.0×10.1 mm.

(1030) *Uroloncha malabarica* (Linn.).

THE WHITE-THROATED MUNIA.

Uroloncha malabarica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 89.

This is one of the widest spread of all the *Munias*. It is found practically all over India as well as in the dry zones of Ceylon. It ascends the Himalayas up to 6,000 feet below Simla; to the East it extends to Eastern Bengal and Cachar, but not to Northern Assam or further East. On the West it occurs in both Afghanistan and Baluchistan and has been obtained at Muscat in Persia. As in the 'Fauna,' I still retain these last birds and those from Sind all under one name with those from the rest of India.

This *Munia* over the whole of its immense range keeps much to the drier, less well-watered areas, and it is only in the East, as in Bengal, it is to be found in really very wet climates, while even there it avoids the wettest districts. I once found its nest in Cachar, but its occurrence there is most exceptional.

It is a bird of towns, villages and gardens but breeds anywhere in open country.

As regards the site of the nests, Hume thus sums up his information:—"Normally, in fact nine times out of ten, they place their nests in low thorny bushes, at heights from 1 foot to 5 feet from the ground; but I have found them in the most out of the way situations—once in a hole in a wall, once in an old thatch, several times in a haycock in my own ground, and once in amongst some dry bushes, stuck up as supports for, and almost covered with, sweet peas.

"Typically the nest is large and globular, loosely put together with fine and coarse grass, the latter predominating on the outside, the former on the inside, and with more or less of fine vegetable down as a lining. But they are sometimes only partially covered over, sometimes quite open above, and all kinds of odds and ends are sometimes pressed into service."

Of nests found by himself, Hume mentions one which was a flat saucer made of the flower-stems of a species of *Agrestis* mixed with tiny pieces of cotton and wool, a piece of red cloth and a few pieces of cotton-cloth. A second nest was a complete sphere of fine grasses thickly lined with cotton-wool, while a third was a ball made of the flowering stalks of delicate grasses with a good deal of cotton and one greenish rag incorporated.

Correspondents of Hume give details of still more curious sites.

Blewitt relates how, having taken three eggs from a nest of *Aquila fulvescens*, he noticed a pair of these Munias fussing round the Eagle's nest and, on a further investigation, found their nest built inside the sticks forming the base of the Eagle's nest, so that, when both birds were sitting, they were not two inches apart. Nor is a nest of this kind very rare, for Butler wrote to Hume saying: "I have seen numerous instances in the neighbourhood of Belgaum of nests built in the stick nests of *Neophron ginginianus* and *Aquila vindhiana*. In fact this seems to be one of the favourite sites selected."

They frequently breed in the thatch of houses and in verandah creepers etc. Marshall, Inglis, Coltart and others have taken nests from boles in the thatch, the nest in these cases being, as one would expect, mere chips of broken thatching grass in a pad for the reception of the eggs. On one occasion Marshall found they had appropriated the nest of a pair of Sparrows, and there were four eggs of that bird in addition to seven of their own.

This trespass into, and theft of, other birds' nests seems to be not uncommon. Blewitt records their laying in an old Weaver-Bird's nest hung up in a verandah, while Sykes says that on the Deccan he frequently found them in possession of deserted nests of Weaver-Birds. Many correspondents also report two or more pairs of this Munia breeding in one nest.

Theobald found 25 eggs in one nest, being of two different shapes, and obviously the product of two or more females. Blewitt remarks that it is very difficult to say how many eggs this bird lays, as he once found fifteen, in different stages of incubation, belonging to two or three pairs, all in one nest. Aitken also says that two pairs will sometimes go into partnership, while many refer to the large number of eggs often found in a nest, due to two or more pairs occupying it.

Even when their own nest is of normal spherical construction it varies greatly in size. Most nests are about 7 inches, both high and broad, but some are much larger and others rather smaller. They breed practically all the year round, but most birds lay from the latter half of June to September, having two or more broods. In Ceylon they lay from December to March. Hume believed there were two principal periods of laying in West and North-West India, first from January to April and then again from July to September. Theobald also found eggs in October and December. Jasse took many nests in the United Provinces in March and others in November, December, July and August.

The full clutch of eggs is five to eight but, as so many have recorded, up to 25 eggs have been found in one nest, with nothing to prove how many birds have laid them.

One hundred eggs average 15.7×11.7 mm. : maxima 18.5×11.5 and 16.6×12.5 mm. ; minima 13.5×12.2 and 14.8×11.2 mm.

Uroloncha punctulata.

THE SPOTTED MUNIA.

(1031) Uroloncha punctulata punctulata (Linn.).

THE INDIAN SPOTTED MUNIA.

Uroloncha punctulata punctulata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 91.

This is another of our familiar Indian birds known to everyone and breeding all over India, except in the driest and most desert areas, such as Sind and Rajputana. In the desert parts of the Punjab and North-West Provinces also it is not to be found. It occurs in the Himalayas up to 5,000 feet and in the hills South of Assam up to about the same height, while in the Nilgiris it is found at even greater elevations.

It is a most confiding little bird, breeding in gardens and all about villages and towns, often making its nest in thatch and trellises of houses. In some places where it is even more common than usual it breeds in colonies. Thus Layard once counted 40 nests in one tree, while Miss Cockburn had no less than eight pairs breeding in the trellis-work on the verandah of her house in the Nilgiris.

The nest is quite a typical Munia's, round and made of grass, straw, strips of grass-blades and grass-bark, occasionally bamboo, leaves and, according to Hume and others, "leaves of bajera, jowar and the like." As a rule it is very loosely and clumsily put together, with a most untidy ill-finished hole on one side as an entrance. Sometimes, especially when built of Jute-fibre, as I have seen in Bengal, it is much neater and more compact. Unlike many other Munias, this species makes a very definite lining to its nest of fine grass-stems or the fine flowering ends of seeding-grass, or, less often, of very fine roots. Hume says that occasionally the lining is made of the beards of wheat.

The nest is very large, but the extremes of size are great. I have seen a nest of Jute not exceeding 5 inches in depth or diameter, but I have also seen one enormous nest in Dacca which measured no less than 18 inches in depth and 15 inches in width. An average nest probably measures about 8 inches either way. As a rule the nest is a fairly correct sphere, but some are wider than high and others higher than wide. The nests are generally placed in bushes or small trees, thorny ones being most often chosen, at any height from 2 to 20 feet from the ground, though most are built at about 5 to 7 feet. All sorts of queer places are sometimes adopted as sites. Trellis-work over verandahs and garden arches are commonly used; creepers growing anywhere; thatch of bungalows and outhouses; corners under the eaves of the same; while Hume mentions one built in a straw scarecrow.

Miss Cockburn gives a delightful account of this little bird's breeding. She writes :—

"The Spotted Munia is migratory with us, and only appears on the Nilgiris during June and the four following months.

"They return regularly to their old haunts, even to the same bushes in which they built the previous season.

"Several pairs of these birds build in the trellis around our windows, so near the ground that I have often put my finger into the nest and felt the eggs.

"I am perfectly sure that each pair takes possession of the same trellis in which it built in previous years, and that, should the old nest remain where they left it, they commence another alongside it; should, however, the old abode be removed, they will build again in the exact site which it occupied.

"In selecting a place to build on they sit on a twig and, raising themselves as high as possible, flap their wings over their backs to ascertain that no small branches are likely to obstruct the progress of their building. When perfectly satisfied as to the convenience of the spot, the female remains there while the male flies to a short distance, alights on the ground and, breaking off a piece of fine long grass, flies back with it to the female, and continues to bring her at least one piece a minute, while she carries on the building process alone.

"They begin early and build for an hour or so, and then leave it till evening and work late, keeping up an incessant cry of 'Kitty, Kitty, Kitty.'

"They build in July and August, and lay from six to ten white eggs. When the young are fully fledged they accompany their parents to the grain-fields, but continue to return to their nests every evening for a long time after they have left them entirely during the day.

"At one time I counted no less than fourteen nests of these birds in the trellis of our verandah and windows; besides these there were others in the garden on orange-trees and scarlet geraniums."

Although Miss Cockburn noticed only the hen-bird building the nest, this procedure is not always adopted, as I have seen both birds busy at the work, flying backwards and forwards to fetch the grass or other materials for the nest, each for his own work.

Again, although Miss Cockburn is quite correct about the young returning to the nest to roost, this often occurs for even longer than she noticed, and sometimes the birds use it until they are ready to start nesting again. Occasionally the birds will repair their old nest, and I have more than once seen this done, the new green material contrasting strongly with the old. The birds bite and tear the strips off the grass in the way already described.

These Munias breed principally after the rains break in June up to September, but odd eggs may be taken at almost any time. "Wait—found them nesting round Coonoor" any time between February

and September." In Sylhet and the Khasia Hills I found most nests in May and June, but I saw a nest, with the hen sitting on it, on the 13th December and another pair built in a Pomegranate tree in my garden in January.

The normal clutch is anything from five to ten eggs, six to eight perhaps in most cases.

I cannot distinguish between the eggs of this and other Munias, but Hume thought they were longer in shape than others.

One hundred eggs average 16.4×11.6 mm.; maxima 18.0×12.0 mm.; minima 14.8×10.8 and 17.1×10.7 mm.

(1032) *Uroloncha punctulata subundulata* Godw.-Aust.

THE BURMESE SPOTTED MUNIA.

Uroloncha punctulata subundulata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 92.

The breeding range of this race may be said to be the whole of Burma from Manipur to the South of Tenasserim. East it has been recorded from Cochin China, but not from Siam. The birds from Yunnan and Shan States on the East seem referable to *topela*, the Chinese race. Birds from Assam South of the Brahmapootra and South of the higher ranges are somewhat indeterminate, but are nearer the Burmese than the Indian form, many individuals being quite typically Burmese.

There is nothing on record about the breeding of this race beyond Oates's brief note in Hume's 'Nests and Eggs' (vol. ii, p. 145), but there is nothing that can be written in addition to the notes on the preceding form. Nests and eggs, habits and nidification are all identically the same. I obtained one nest with five eggs in the Jiri Valley on the 16th May, but it breeds mostly in July, August and September both in Assam and all over Burma.

The nest is the usual ball of grass, but the clutches, perhaps, do not average as big, and neither Hopwood, Mackenzie, Harington nor myself have seen any of more than six eggs.

Forty eggs average 16.1×11.1 mm.; maxima 17.0×12.0 mm.; minima 14.0×10.4 and 14.8×10.3 mm.

(1032) *Uroloncha punctulata topela* (Swinh.).

THE CHINESE SPOTTED MUNIA.

Uroloncha punctulata topela, Fauna B. I., Birds, 2nd ed. vol. iii, p. 92.

This race is only found within our limits in the Eastern Shan States, the birds from the Bhamo and Kachin Hills being typically *subundulata*. Outside our limits it is extremely common in South China to Formosa and Hainan, and it also occurs in Siam.

In its nidification it differs in no way from the other races ; it is just the same familiar little bird and makes just the same kind of nest in the same kind of place, but it breeds often in colonies. An interesting note by Vaughan and Jones (Ibis, 1913, p. 176) is worth quoting in this connection :—"At Macao, in the Governor's Summer garden, there are two Monkey-puzzler [*sic*] trees, in which large numbers of these birds breed, and where their domestic arrangements are easily watched. The nests are huge for the size of the builders, untidy, oval masses of grass and weeds, having the long axis horizontal, but lined within very carefully with fine grasses, and possessing a well-made rounded entrance-hole at one end. On one occasion two nests were found, built one on the top of the other, but quite separately, so as to form a sort of two-storied structure.

"The usual clutch in Macao is six or seven, and though eight, eleven and twelve eggs have been found, they are probably the product of two hen-birds ; they begin to build late in March, and eggs may be found in April, May and June."

In Siam Hartert found it breeding in August and its nest has been taken by Cook in the Shan States in July and August.

Fifty eggs average 16.6×11.5 mm. ; maxima 18.0×12.1 mm. ; minima 14.8×11.0 and 15.3×10.3 mm.

(1035) *Stictospiza formosa* (Lath.).

THE GREEN MUNIA.

Stictospiza formosa, Fauna B. I., Birds, 2nd ed. vol. iii, p. 94.

The Green Munia is found in Central India, West to Mount Abu, East to Palamau and Lohardaga, North to Jhansi and South to Chanda and Aheri.

This pretty little Munia, though fairly common in some parts of Central India, is not so confiding a bird as many other Munias and, though it haunts cultivation, it keeps away from the immediate vicinity of houses and villages. The consequence is that it has escaped observation, very little being recorded about its nidification except by Blewitt. Barnes obtained nests and eggs at Saugur agreeing in all respects with those taken by Blewitt, who writes as follows :—"When at Saugur, in the month of May, in a sugar-cane field, a favourite resort of this Waxbill, my men discovered two nests built on, and firmly attached to, the stalk-ends of two or three of the upper leaves. They were somewhat oblong in shape and very neatly and compactly made. The interior lining was of fine grass, the exterior of coarse grass and long strips of only sugar-cane leaves, well interwoven with the coarse grass. The men told me the birds had deserted the nests.

"Two years ago, in January, my men shot a young bird which had just left the nest."

Later on Blewitt adds :—

"In a sugar-cane about two acres in extent, on the banks of a broad hill torrent, I found four unfinished and three complete nests, each containing five eggs, of *S. formosa*.

"The nests one and all were some five feet from the ground, in the upper portion of the sugar-cane, the stalk forming a side support, opposite the entrance. The framework of the nest is first strongly and neatly secured by lacings of coarse grass between two of the cane-leaves, one above and the other below ; but as the building proceeds, three, if not four, additional leaves are caught on to the sides of the nest, and firmly interlaced into the exterior material. When finished, the nests are large globular structures, made exteriorly of coarse grass and strips of the cane-leaf itself, the inner cavity being thickly lined with very fine grass, all somewhat compactly put together.

"The entrance-hole, which is prolonged into a short neck, is invariably in the centre, opposite the side supported by the cane-stalk, and is well concealed by projecting grass-fibres.

"Five is apparently the normal number of the eggs, and both sexes are equally employed in building the nest and incubating the eggs. One male was shot busily at work at the short neck of the nest, the female the while sitting on the eggs. Evidently a new nest is prepared each successive season, and I think they always breed in society, several nests being found in close proximity."

Sixteen eggs average 17.21×11.9 mm.

(1036) *Amandava amandava* (Linn.).

THE INDIAN RED MUNIA.

Amandava amandava, Fauna B. I., Birds, 2nd ed. vol. iii, p. 96.

The Indian Red Munia is found in Ceylon and over the greater part of India and Northern Burma except in the driest and most arid areas. It extends to Siam, Cochin China and is also found in Singapore and Java, where it may have been introduced, as it has to Mauritius. It ascends the Himalayas up to some 6,000 feet, and is found up to 4,000 in the hills of Cachar and South Assam. In the Nilgiris and hills of Southern India it ascends to the highest valleys.

This handsome little Finch breeds in gardens, hedges, round villages, in cultivated fields and, also, in thin scrub far from human habitation, but never, I believe, in true forest or dense scrub.

The nest is quite typical of the family, a ball of grass, generally a little flattened both at the top and bottom, so wider than high.

Occasionally, however, it may have the vertical axes longer than the width. Externally it is made of fine grass and coarse grass mixed, sometimes one predominating, sometimes the other, and on this seems to depend the size of the nest. One found by myself and made almost entirely of coarse grass-blades and strips of the same measured roughly 8 inches high by about 7 wide. Another, made all of fine grass-stems and the finest strips of the blades, did not measure more than 5 by 5 inches, though this was exceptionally small. I have never seen any other lining than fine grass, the flowering ends of the same, or the seed-down matted together to form a soft bed. Butler, however, found a nest lined "with a few large white feathers; in fact the cock bird brought one of these feathers to the nest just before I took it." So, also, Miss Cockburn writes:—"These birds build large round nests lined with a few feathers."

Other collectors have all recorded the lining to be such as I have myself found.

Like so many of the Weaver-Bird family, the cocks often add to the nest while the hen is incubating. This I have often seen myself, and Blewitt says:—"The male bird often persistently continues to bring and add materials to the nest during the process of incubation. The return of the bird with grass in his beak has many a time betrayed the situation of the nest, with the female and full complement of eggs, partially incubated, which, but for this singular habit, would never have been discovered."

The nest is placed well inside some low, densely foliated and thorny bush, completely concealed from casual view and often very difficult to find. As a rule it is pushed in among a mass of twigs, supported below and at the sides but never suspended. Nor is the material of the nest wound round the twigs, though now and then a few loose strands of grass may be taken round one of the twigs at the side of the nest.

Sometimes the bushes selected may be more or less overgrown with grass, but I have never seen and seldom heard of any nest built in grass alone. They like the vicinity of water and often, but not invariably, build near ponds, streams and canals, while Betham found several nests in grass and rushes standing in water. These nests were very low down, only a few inches above the water, and when they are built in hushes few nests will be found more than three feet above the ground and most much lower still. Sometimes they are built on the ground. Blewitt found one at the foot of a Plum-bush and Inglis also took one actually on the ground.

Nests with eggs may be found all the year round, but in the South, Nilgiris etc. they seem to breed chiefly in the cold weather, October to March. Over most of Northern India they lay from July to

October, but in Assam we found most eggs between June and August.

The normal clutch of eggs numbers six to ten, while Rhodes Morgan found fourteen in one nest, in the Nilgiris, though he believed these to have been the produce of two females.

One hundred eggs average 14.4×11.2 mm. : maxima 17.0×12.1 and 15.5×12.5 mm. ; minima 13.0×10.6 mm.

(1037) *Amandava flavidiventris* (Wallace).

THE BURMESE RED MUNIA.

Amandava flavidiventris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 97.

This Munia, which to me seems to be a representative species, rather than a geographical race, of the Indian bird, is found from the Southern Shan States South to Tenasserim.

The nidification of the Burmese Red Munia differs very little from that of the Indian species. Oates, writing from Pegu, says :— "I have taken the eggs on the 2nd Nov. and subsequently in the same month. The nest is placed near the ground in soft luxuriant grass. It is a spherical mass of grass, about 6 inches outside diameter, with an opening at the side. The majority of the structures are lined with feathers."

I have nests and eggs taken by Wickham in November in the South Shan States, but these were all grass nests built low down in elephant or other coarse grass 6 to 8 feet high. According to Wickham they breed only once a year in the cold weather, when grass-seed, their principal food, is most abundant. Nests found by Harington in the same state were similar, but he found two nests lined with feathers. He obtained most of his nests while riding or shooting on hearing the chirp of the little bird as it left its nest almost at his feet.

The breeding season lasts apparently from August to January and the birds lay four to eight eggs, generally six.

Thirty eggs average 13.9×11.1 mm. : maxima 15.9×11.0 and 14.2×11.9 mm. ; minima 13.1×10.9 and 14.0×10.7 mm.

Family FRINGILLIDÆ

(FINCHES).

Subfamily COCCOTHAUSTINÆ

(HAWFINCHES).

Perissospiza ieterioides.

THE BLACK-AND-YELLOW GROSBEEK.

(1039) *Perissospiza ieterioides ieterioides* (Vigors).

THE SIMLA BLACK-AND-YELLOW GROSBEEK.

Perissospiza ieterioides ieterioides, Fauna B. I., Birds, 2nd ed. vol. iii, p. 102.

This, the typical form of Black-and-Yellow Grosbeak, occurs from Afghanistan throughout the Outer Himalayas, through Southern Kashmir to the Simla States, breeding at elevations of 5,500 feet and upwards but not, apparently, at the greater heights over 9,000 or 10,000 feet.

This Finch is a bird of Pine and other coniferous forests, being also found in more open country in which small spinneys and single coniferous trees are plentiful.

The first ornithologist to take its nest with eggs was Captain Cock, who succeeded in doing so both in the Murree Hills and in Kashmir. He took a good many nests with eggs in May and June near Danga Gali and shot a female off one nest which he describes as follows:—"My first nest, containing three eggs, was taken on the 28th May, at 8,000 feet elevation, upon a sapling lime. The nest was composed of a few twigs and grass, and lined with stalks of maidenhair fern and fine roots. I shot the female as she left the nest."

Jones (A. E.) gives a rather fuller description of its nesting (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 610, 1919):—

"This is a resident species, coming right into Simla in winter. In the summer its haunts are the Deodar (*C. deodara*) forest just North and North-East of Simla, where it breeds from 7,500 feet upwards. The seven nests of which I have records varied in height from 18 feet to 60 feet from the ground. Most nests are placed close to the main stem of the tree (Deodar and Spruce) but I found one placed on a horizontal branch 10 feet away from the trunk, and had to extract the eggs with the help of a spoon tied to the end of a stick. The materials of the nest are fine twigs, lichen and silvery plant-stems, with occasionally a little moss, lined with dry grass

and rootlets. Both birds assist in building. Eggs two or three, quite as often the former as the latter."

Rattray, who took nests in the Murree Hills between 5,500 and 8,000 feet, all in fir-trees, describes the nests as "broad and rather large cups, very well and strongly built, the materials compactly and neatly put together. They are made of twigs, roots and mosses and lined with finer roots. They are placed high up and often at the junction of large boughs with the main trunk, so that they are practically invisible from below, and the nests have to be found by watching the birds."

The breeding season is May and June but Buchanan found one nest on the 4th April containing a full clutch of three eggs. It is possible, but not probable, that they occasionally have two broods.

They lay two or three eggs, as Jones says, one as often as the other.

The ground-colour is a pale French grey (Hume says sometimes tinged with green, but I have never seen this). The marks consist of deep purple-black spots and broad scrolls and lines with secondary marks consisting of very fine intertwisted lines and specks of pale brown and lavender-grey. The lines and scrolls are nearly always confined to the larger end, where they form broad rings, often with clouds of suffused colour underneath the ring. Elsewhere there are only a few dark blots and scanty veining of grey. In some eggs the larger, blacker spots look as if they had run.

In shape the eggs are rather long ovals, sometimes distinctly pointed. The texture is fine and the surface close and generally well glossed.

Forty eggs average 28.3×19.9 mm.: maxima 32.0×20.0 and 29.3×20.7 mm.; minima 26.1×20.2 and 26.9×19.0 mm.

Rattray tells me that both birds build the nest, but there is no information available as to period of incubation or whether both sexes carry this out.

***Perissospiza carnipes* *.**

THE WHITE-WINGED GROSBEEK.

(1041) *Perissospiza carnipes carnipes* (Hodgs.).

THE NEPAL WHITE-WINGED GROSBEEK.

Perissospiza carnipes, Fauna B. I., Birds, 2nd ed. vol. ii, p. 104 (part.).

The typical form is named from Nepal. West it occurs as far as the Garhwal State and East to the hills North of Eastern Assam.

* As *Perissospiza carnipes speculigera* Brandt is now generally accepted as a recognizable race, the true *carnipes* must also come under a trinomial. *Speculigera* is not a very marked race.

The only account of the breeding of this Finch is given by Whympers (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 990, 1910). He writes:—"Several pairs of these birds were first observed at about 11,000 feet, and they gradually moved up to 14,000, and there we marked down two nests and got three fresh eggs from each on June 28th. One nest was in a birch about 15 feet up and the other about six feet up in tall bushes of juniper. Both nests were precisely similar and were very curiously made, there being a sort of outer nest of prickly twigs, then twisted grass, and the inner lining being entirely composed of strips of juniper-bark. They were very wary and took a long time building. I first saw the females carrying grass on June 11th." The following year Whympers obtained another nest in the same place, the Nila Valley, on the 4th July. This was like the other two, and was "built on a small birch at the extreme limit of birch-forest, and I have only seen them nest there."

Eggs have been taken from the 22nd June to the 4th July. Two or three eggs only are laid.

The eggs are exactly like those of *P. i. icteroides* except that they have a stronger tinge of pink or carmine, caused for the most part by a greater proportion of the markings having the curious pinkish halo round them, looking as if they had run.

Ten eggs average 27.0×19.1 mm.: maxima 28.0×20.0 mm.; minima 26.1×19.8 and 26.3×18.2 mm.

(1041 a) *Perissospiza carnipes speculigera* Brandt.

THE TURKESTAN WHITE-WINGED GROSBEAK.

Perissospiza carnipes, Fauna B. I., Birds, 2nd ed. vol. iii, p. 104 (part.).

Perissospiza carnipes speculigera Brandt, Bull. Sci. Acad. St. Petersb. vol. ix, p. 11, 1842: Turkestan.

The range of this race extends from North Persia to Afghanistan, and Turkestan to Dharmasala.

Whitehead found this race breeding on the North-West Frontier (Ibis, 1909, p. 227). He writes:—"Not nearly so common as the last species, *P. icteroides*, but much bolder and less of a forest bird, keeping more to the Juniper-scrub between 8,000 and 12,000 feet. Frequently to be seen perched in some prominent position, uttering its familiar notes *wil-ye-go-ame* or *croak-et-et*. I found a nest containing two hard-set eggs on the 7th July. It was beautifully made of twigs and bents, well lined with fresh strips of Juniper-bark. The eggs were of the Hawfinch type, of a French-white colour, with strong reddish-brown markings, and averaged $1.18'' \times .72''$ " (= about 30.0×18.3 mm.).

Ward obtained several specimens from Pyas, Kistwar, in July and August, so they must have been breeding there.

(1042) *Mycerobas melanoxanthos* (Hodgs.).

THE SPOTTED-WINGED GROSBEEK.

Mycerobas melanoxanthus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 105.

This grand Grosbeak breeds all through the Himalayas from Afghanistan to Szetchuan, though it appears to be common nowhere.

I saw it in Summer in the hills South of the Brahmapootra, both in the Cachar and Khasia Hills, but failed to find its nest, and they *may* have been non-breeding birds.

Captain R. A. Skinner took a nest on the 22nd June, 1908, which he describes as follows (Journ. Bomb. Nat. Hist. Soc. vol. xviii, p. 907, 1909):—"The nest was in a Yew-tree about 15 feet from the ground, on side of a steep hill, built on a branch towards the end, composed of a base or platform of twigs from the Silver Fir (*Abies webbiana*), on the top of which was a cup-shaped nest of moss lined with maidenhair stems and fine roots; diameter of nest $3\frac{1}{2}$ ", depth $1\frac{3}{4}$ ", internal measurements. The outside of the nest was lined with some green stuff which remained green and did not dry up, which aided its concealment. I sent the man I employed up the tree and the bird remained sitting till he came right up to the nest. We waited for ten minutes or a quarter of an hour, when the male bird turned up and, having a good look at him, flew away; the female came soon afterwards and I shot her close to the nest. There was a full clutch of three eggs, which were marked, in the same way as those of the Black-and-Yellow Grosbeak, with streaks and blotches, only the markings are decidedly more reddish-brown; the ground-colour is light green. The eggs were fresh. Size $1.08 \times .8$ " ($=27.4 \times 20.2$ mm.), $1.07 \times .84$ " ($=26.2 \times 21.3$ mm.) and $1.07 \times .8$ " ($=26.2 \times 20.2$ mm.)."

The nest was in a nullah in Fir-forest, at an elevation of 8,000 feet, in Danga Gali, near Murree.

Coltart had a nest with two eggs and a female of this species brought in to him on the 8th May, which had been taken three or four days previously by Nagas of the Patkoi Range at about 6,000-8,000 feet. As I was present at the time all were handed over to me. The nest was a bulky cup, well and neatly made and very compact, composed of grass, moss, small twigs and roots and lined with fine roots. It was, in fact, just like the nests of *Perissospiza* but rather larger and more bulky. It had been taken high up in a Pine-tree, some of the needles of which still adhered to the nest. It contained two eggs, measuring 30.1×20.3 and 30.0×20.9 mm.

In colour the eggs are a very pale grey-green, very feebly marked at the larger end with a ring of pale grey-brown and reddish freckles; inside the ring are a few more of the same markings, but elsewhere the eggs are immaculate. They will assuredly prove to be abnormally weakly-marked specimens.

Subfamily FRINGILLINÆ

(TRUE FINCHES).

(1043) *Pyrrhula aurantiaca* Gould.

THE ORANGE BULLFINCH.

Pyrrhula aurantiaca, Fauna B. I., Birds, 2nd ed. vol. iii, p. 109.

The Orange Bullfinch ranges from Gilgit and Hazara, through Kashmir, to the Simla States and Garhwal.

We have two accounts of this bird's breeding which, though very different, are both correct beyond all doubt.

The first is a short note by Ward (Journ. Bomb. Nat. Hist. Soc. vol. xviii, p. 463, 1908) to the following effect:—"At last the nests and eggs have been taken by my collectors. These were found on the Kolahoi Mountain in Kashmir, between 12,000 and 13,000 feet, in a bush. The nests are small cups of dry grasses lined with the hair of the musk-deer. The eggs are dull white, marked with reddish-brown in small streaks and spots, chiefly at the thicker end. The dates were August 18th and 21st (1906)."

The birds shot off their nests were sent to me for confirmation of Ward's identification, as the eggs and nests were so unlike Bullfinches' that I ventured to express a doubt. More were taken in 1908.

The next account is that of Osmaston (*ibid.* vol. xxxi, p. 993, 1927). He writes:—"This handsome bird is a resident species in Kashmir, being found in the lower mixed forest, in the side valleys, in winter from 5,500 to 6,500 feet, and in summer between 9,000 and 11,000 feet. They are not very common anywhere and are rather solitary, quiet and unobtrusive birds.

"In the breeding season they are to be found in openings in the silver-fir and birch forests, especially where there is plenty of young tree growth and herbaceous weeds.

"They commence building early in July. Nests are usually in silver firs or yew trees, either in a patch of young trees or on the lower branch of a big tree.

"A nest found on August 4th at 9,000' in the Liddar Valley exactly resembled that of the English Bullfinch, being composed of thin twigs and sticks and lined with fine roots. The young had just left the nest, which was placed on the horizontal branch of a silver fir sapling, sheltered above by a second branch and about four feet from the ground. It was in a thick clump of similar young trees.

"All the birds seen were in the fir, or birch and fir, forests and they certainly do not breed above the forest limit."

In 1908 Ward took several more nests and eggs, all like those he had previously taken and at the same elevation on the same mountain. These were taken in the end of August.

A very charming account of this bird and its nesting is given by Major Magrath (*Journ. Bomb. Nat. Hist. Soc.* vol. xxi, p. 1307, 1913). The nest is described as "smaller but not unlike that of the European Bullfinch—a platform of twigs on which was built a shallow cup of fine rootlets and a little dried grass. A few goat's hairs completed the lining."

The eggs were like those taken by Ward and were taken on the 8th August.

The number of eggs laid is normally three, though Ward obtained one clutch of four.

The eggs are white with small flecks and tiny blotches of reddish-brown, fairly numerous at the larger end but sparse elsewhere, except in two eggs—one in a clutch of four and one in a clutch of three.

In shape they are long, rather pointed ovals, the texture close and very fine but the surface glossless.

Thirteen eggs average 21.3×15.0 mm.; maxima 22.3×15.0 and 20.6×15.1 mm.; minima 20.0×15.1 and 21.0×14.8 mm.

(1044) *Pyrrhula erythrocephala* Vigors.

THE RED-HEADED BULLFINCH.

Pyrrhula erythrocephala, Fauna B. I., Birds, 2nd ed. vol. iii, p. 110.

During the breeding season this Bullfinch is found between 9,000 and 12,000 feet in the Himalayas from Chamba and South Kashmir to Bhutan and the hills of Assam North of the Brabmapootra.

They are birds which frequent dense forests of Deodars, Firs or mixed forest of Firs and Birch, and probably do not breed much below 9,000 feet, though Stoliczka says that they breed about Koteghar between 6,000 and 8,000 feet. Had this been so Jones, Dodsworth or some other of our Simla collectors must have come across the nest.

Whympers found it breeding at Phurkia, Kuman, at 9,000–10,000 feet, and again in the Pindar Valley, Garhwal, at 12,000 feet (*Journ. Bomb. Nat. Hist. Soc.* vol. xix, p. 991, 1910). He writes:—"One nest was taken at about 12,000 ft.; it was placed 10 ft. up in a small tree and was made of thin twigs and beard-moss (*Usnea barbata*) and lined with rather coarse roots."

Nests with eggs were taken by Whympers every year from 1909 to 1912 and all are described as alike, the characteristic being the curious intermediate lining of white beard-moss between the true lining of roots and the outer walls of twigs.

The eggs of this bird were all taken by Whympers in August, in the latter half of the month.

Three or four eggs are laid, which are far more like Greenfinch's eggs than that of our English Bullfinch. The ground is a dull

grey-white, very faintly tinted with green or puce, while the markings consist of primary specks and small blotches of brown, or red-brown and secondary similar marks of dark grey and pale lavender. These are distributed in a ring round the larger end, sometimes dense and at other times straggling, and very sparsely scattered over the rest of the surface.

In shape they are rather long ovals, sometimes rather pointed. The texture is fine but the surface is glossless and the shells very fragile.

Thirteen eggs average 20.8×14.7 mm.: maxima 22.4×15.0 and 21.1×15.2 mm.; minima 19.7×14.1 mm.

Pyrrhula nipalensis.

THE BROWN BULLFINCH.

(1047) *Pyrrhula nipalensis nipalensis* Hodgs.

THE NEPAL BROWN BULLFINCH.

Pyrrhula nipalensis nipalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 112.

With sufficient material for comparison I have no doubt the present subspecies will have to be split up into two or even three more geographical races. For the present I retain all under the above name, with a range from Gilgit to Eastern Assam, and thence to Fokhien and Kuatun in China.

They are birds of Fir-forests at elevations between 9,000 feet and the tree limit. Jones obtained specimens in September at Baghi and Kambor Dhar at 10,000 feet, at which places they probably breed, but no one has succeeded in finding nests in the Simla or adjoining States.

The only eggs ever taken were obtained by Mr. P. Morrison, from whom I received a small collection of eggs taken at Darjiling and round about that station. Among these were three nests and eggs said to be those of this Bullfinch and which were, I think, correctly identified. They were all three taken in the last week of August 1882, containing 3, 2 and 1 egg respectively. The nests were all placed in stunted Firs, between 5 and 8 feet from the ground, which the collector called Fir-bushes. In appearance they were not unlike those of the English Bullfinch, rather neat but bulky cups of grass, twigs and coarse roots, with a little dry moss woven in with the rest and a little moss, said to have been green when the nests were taken, on the outside. The lining in all three was of roots, rather fine and black in colour.

The eggs are like those of the Red-headed Bullfinch but still duller in colour, possibly due to their age and not having been kept excluded from light.

The six eggs average 20.0×15.1 mm.: maxima 20.8×15.0 and 20.2×15.4 mm.; minima 19.6×15.0 mm.

Loxia curvirostra.**THE CROSSBILL.****(1050) *Loxia curvirostra himalayana* Blyth.****THE HIMALAYAN CROSSBILL.**

Loxia curvirostra himalayana, Fauna B. I., Birds, 2nd ed. vol. iii, p. 115.

This Crossbill is said to occur from Chini and Lahul to Sikkim and South-East Tibet. Its occurrence in Lahul is said by Osmaston to be doubtful, as he never met with it in his three visits to that country, though Stoliczka says that it is common there in Summer. On the other hand, the only supposed record of its breeding is from thence. I have a clutch of five eggs which were sent me from Lahul and said to have been taken at about 12,000 feet by natives. The eggs are exactly like the eggs of the European Crossbill, and are certainly laid by a Crossbill of some kind, and the only one it can be is the present one. They were said to have been taken from a nest built on a stunted Pine at about 25 feet from the ground. The eggs were given to me by Herr M. Kuschel and I could never trace the collector, as Kuschel died very shortly after he gave me these eggs. Ward exchanged eggs with Kuschel, and these may possibly have been taken by his native collectors.

The eggs are a pale, almost white grey-green, with a few specks of black sparsely scattered about the larger end, forming very indefinite rings.

The eggs vary from 22.7×16.6 to 24.0×17.0 mm.

In Sikkim Stevens obtained a male in breeding condition at 11,500 feet and they undoubtedly breed there, though he failed to obtain more birds or their nests.

(1051) *Hæmatospiza sipahi* Hodgs.**THE SCARLET FINCH.**

Hæmatospiza sipahi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 117.

This fine Finch occurs from Nepal to Eastern Assam both North and South of the Brahmapootra.

Very little is yet known about this Finch, which is very common in the Himalayas in the cold weather down to 2,200 feet (Sikkim, Stevens), but has never been tracked to its normal breeding ground.

In the Khasia Hills it is common in Winter down to 3,500 feet but apparently very few birds remain to breed, and I have failed to find it nesting. Every year a few nestlings are obtained by the Khasias, with whom it is a favourite cage-bird, and occasionally nests have been brought in to me with a single egg said to have been of this Finch, once also with a male bird and once with a female.

The nests were all taken in the densest Pine-forests between 5,500 and 6,200 feet and were all placed in stout forks, horizontal

or vertical, of Pine-trees between 25 and 40 feet from the ground. The nests were bulky cups, made outwardly of rather stiff little twigs and a few coarse roots; inside this was a layer of coarse roots, probably moss-roots. In one nest there was some goat's hair in the lining and in a second a few scraps of wool, while in a third nest there was a little dried moss and a few tufts of wool on the outside of the walls.

Outwardly the nests measured about 6 inches across, or rather more, by rather under 3 inches deep, the cavities being about 4 by 1½ inches.

The four eggs in my collection, taken at odd times in many years, as well as the nests in which they were laid, are similar and, though I have never seen the nests *in situ* with the birds, these would appear to have been correctly and honestly identified.

The eggs have a blue ground and they are all marked with small blotches of rather rich red-brown, numerous and coalescing to form a cap in one egg and rings in the others at the larger end. Underlying these are a few fine specks and small smudges of lilac. In one egg the specks become tiny lines and in this egg there is also one long twisted line of dark brown at the larger end.

The eggs vary in size from 22.1×17.3 and 23.2×17.0 to 25.4×18.0 mm.

They were taken between the 7th May and the 24th June.

The reason for my failing to get any Khasia to show me a nest *in situ* was, I think, the enormous value they place on the young birds as pets and their fear that I should want too many of them. On one occasion a Khasia collector did actually shoot a male and bring it in with the nest and afterwards showed me the place where he had got it. The hen, which was brought in to me, was alive in a noose and was taken away after I had satisfied myself as to what it was.

***Pyrrhospiza punicea*.**

THE RED-BREASTED ROSE-FINCH.

(1054) *Pyrrhospiza punicea humii* Sharpe.

THE WESTERN RED-BREASTED ROSE-FINCH.

Pyrrhospiza punicea humii, Fauna B. I., Birds, 2nd ed. vol. iii, p. 121.

This large Rose-Finch is to be found breeding from the North-West Frontier to Garhwal at very high elevations. Whitehead (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 107, 1914) says that it is common in the Khagan Valley between 12,000 and 14,000 feet, while other observers have found it in Ladak and elsewhere in the breeding season up to 17,000 feet. Whympers records it as breeding in the Nila Valley, Garhwal, at over 13,000 feet, though the nests he found all contained young.

There is practically nothing on record about this bird's breeding beyond Whitehead's note, in which he writes:—"The only nest found was being built on a ledge in a cliff and not on a bush."

Ward, however, took several nests of this Finch at, and near, Chusal at about 14,200 feet in June and July. Two clutches of these eggs, one of three and one of two, are now in my collection, while a third, also of two, is in the magnificent Palearctic collection of the Rev. F. C. R. Jourdain. These three nests were taken on the 7th June and the 7th and 16th July, and with the first, which Ward gave me, I received the following note:—"I am sending you two eggs—full clutch—of *Pyrrhospiza punicea*, which I believe are new to you and, indeed, to science. The birds are not rare about Chusal, where they breed in the stunted thorn-bushes and juniper up to over 14,000 feet. The nests are rather shallow cups of coarse grass and roots, lined with finer grass and often having many thorny twigs woven into the outside of the nest."

Stoliczka says that he found this Finch in Summer at Spiti and Ladak between 13,000 and 17,000 feet, but his description of the nest and eggs, the latter "dirty white or greenish," cannot possibly refer to this bird.

The eggs are typical of the Rose-Finches, a deep blue, very faintly tinged with green and with a few black spots at the larger end and, in one, two or three lines of the same. In one egg the spots are at the small end, indicative of a reversed position prior to expulsion.

The texture is fairly fine, smooth but glossless, while in shape the eggs are long, rather pointed ovals.

The seven eggs average 24.6×17.0 mm. : maxima 26.1×17.1 and 25.0×17.4 mm. ; minima 23.6×17.0 and 25.0×16.5 mm.

Propasser thura.

THE WHITE-BROWED ROSE-FINCH.

(1055) **Propasser thura thura** (Bon. & Schl.).

THE NEPAL WHITE-BROWED ROSE-FINCH.

Propasser thura thura, Fauna B. I., Birds, 2nd ed. vol. iii, p. 123.

The distribution of this Finch seems to be restricted to the Simla Hills, Garhwal, Nepal, Sikkim and Western Tibet.

This also is a Rose-Finch which breeds at great elevations. In Sikkim Stevens found it during Summer at about 12,000 feet upwards, while Whympere obtained the nest in Garhwal at 15,000 feet.

Mandelli took a nest and eggs of this species on the 1st August in the Dolaka District of Nepal at 12,000 feet. "It was placed on a thorny bush at a height of about six feet from the ground, and contained three fresh eggs. The nest is an extremely regular

and compact cup 4 inches in diameter and 2 inches in height exteriorly; it is mainly composed of fine grass-stems, but very little of this is seen, as it is completely coated outside with brown moss and very fine black moss and fern-roots, and it is warmly lined with white hair, the fur of some animal; the cavity measured 2 inches in diameter, and a little over 1 in depth."

Whympers obtained two nests in Garhwal, of which he writes (Journ. Bomb. Nat. Hist. Soc. vol. xx, p. 1159, 1911):—"Two nests of this bird were taken at 13,000 feet at the end of July; the nests were placed low down in juniper bushes and built solidly of dry grass with an inner lining of hair. The eggs are clear greenish blue, sparingly spotted with black, not with brownish grey as mentioned by Mandelli. The clutch appears to be four."

A third clutch, which Whympers gave to me, was found at 15,000 feet and also contained four eggs.

Finally, Ward found it breeding at Tar Sar on the 7th August at 12,000 feet, and procured one nest with four eggs. The nest is described as "a rather large saucer of very fine grasses, built in a juniper bush low down." This may be *blythi*, but I cannot trace Tar Sar.

The eggs are quite typical of the Rose-Finch group, but those of this species, *thura*, are rather deep in tint.

Sixteen eggs average 22.1×16.1 mm.; maxima 23.0×16.1 and 22.6×16.4 mm.; minima 20.2×16.0 and 22.5×15.6 mm.

(1056) *Propasser thura blythi** Biddulph.

THE KASHMIR WHITE-BROWED ROSE-FINCH.

Propasser thura blythi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 124.

This race of the White-browed Rose-Finch is found from the Afghan and Baluchistan Frontiers to Gilgit and Northern Kashmir.

It apparently breeds at lower elevations and earlier in the season than its nearest relations. The only notes on its nidification are those of Whitehead and Ward. The latter (Journ. Bomb. Nat. Hist. Soc. vol. xviii, p. 463, 1912) writes:—"Three clutches of eggs, (4), (3), (4), were found on August 6th, 9th and 10th, very high up in the hills where the Sind and the Liddar rivers rise in Kashmir. The nests were in bushes and the creeping juniper plants; they were composed of soft grasses and seed-pods and were large and saucer-shaped. The eggs are devoid of gloss, greenish blue in colouring, sparingly spotted with black at the thick end. One clutch is very pointed. The eggs average $.85 \times .60$ inches" (= 22.2×15.2 mm.)

* Ticehurst says that the name of this race should be *P. frontalis* Blyth (Ibis, 1862, p. 390). Blyth's bird, however, came from Sikkim, and *frontalis* is, therefore, a synonym of *thura*.

Whitehead (Ibis, 1909, p. 228), under the name of *Propasser dubius*, says that the bird is not "uncommon in the Safed Koh in summer from 8,000 to 11,000 feet. Apparently an early breeder. I came on a family very strong on the wing on the 29th June."

(1057) *Propasser thura dubius* (Przew.).

THE KANSU WHITE-BROWED ROSE-FINCH.

Propasser thura dubius, Fauna B. I., Birds, 2nd ed. vol. iii, p. 125.

The range of this Rose-Finch is Eastern Tibet and North-West China, but it seems to have curious irruptions into South-Central Tibet, as twice since I have had collectors working for me in that country I have had several nests, eggs and skins sent me. The first occasion was in 1917, when in July and August some remnants of skins and two nests, each with four eggs, were sent to me, said to have been taken near Phari at about 15,000 feet. After this not a single bird, nest or egg was obtained until August 1921, when more nests, twelve eggs and three skins were sent to me. These were said to have been taken "North-East of Gyantse at between 14,000 and 16,000 feet."

The nests are rather shallow, but fairly compact cups composed principally of coarse grass and roots, with a little dried moss and a few stiff little twigs in the outer walls. The two taken in 1917 were both lined with what I think was goat's hair and had been built low down in tangles of Rose-bushes; those sent me in 1921 were all lined with black Yak's-hair, and were built almost on the ground in thick, thorny little bushes.

The nests were all taken between the 29th July and the 26th August.

Four eggs seems to be the full complement, two nests containing only three. They are quite typical and cannot be distinguished from those of the other races.

Twenty eggs average 21.6×14.9 mm.: maxima 23.6×14.6 and 21.9×15.8 mm.; minima 20.2×14.8 and 21.0×14.1 mm.

Propasser pulcherrimus.

THE BEAUTIFUL ROSE-FINCH.

(1059) *Propasser pulcherrimus pulcherrimus* Blyth.

THE NEPAL BEAUTIFUL ROSE-FINCH.

Propasser pulcherrimus pulcherrimus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 126.

This Rose-Finch is distributed over practically the whole of the Western Himalayas as far East as Western Tibet.

Whympers writes of this bird's nidification to me as follows :—
 "This Rose-Finch was a common bird in the Nila Valley, Garhwal, and still more so on the Pindari Glacier and Gangnani in the Kumaon, between 13,000 and 14,000 feet, and well above tree-level. At the same time I have seen a few nests in the highest birch-tree level of 11,000 and 12,000 feet, but this only occasionally, although they were so common 2,000 feet higher. At Gangnani I knew of 30 nests built on open, rather steeply sloping and rocky ground, on which grew stunted juniper and innumerable little prickly bushes of which I do not know the name. Most nests were built in the thorny scrub and only a few in the juniper, being placed about 2' from the ground and, as a rule, well hidden. Most nests were made almost entirely of grass lined with hair, mostly horse-hair or goat's hair. Other nests were constructed of grass, roots, fibre of sorts, often a few tufts of wool, with a lining of wool, fur or hair. In shape the nests were rather deep cups, not badly made, and rather compact and neat for Rose-Finches' nests. Until the clutch is complete the hen bird is very shy, and it is difficult to get a sight of her, but once all the eggs are laid she sits very tight. This is fortunate, as *Carpodacus erythrinus* and *Propasser rhodochrous* nest in the same regions, for the hen of *pulcherrimus* is easy to identify on the nest (by the presence or absence of the supercilium). I think the hen bird alone incubates, as I have never seen the cock on the nest.

"The full clutch of eggs is four or five, one as often as the other, and three never seem to be incubated. They breed from the latter half of July all through August and I took five nests on the 20th of the latter month, all with fresh eggs."

A. E. Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xxviii, p. 151, 1921) found this Rose-Finch breeding about Girthi, on the borders of Tibet, and took three nests between the 3rd and 8th August at 13,000 to 13,500 feet. These "nests were placed 6" to 18" above the ground in hushes of *Juniperus pseudosabimus*. They were fairly deep cups, composed outside of the fibrous bark of juniper and *Lonicera*, with or without a little grass; this was followed by a layer of fine roots mixed with a little sheep's wool, and there was a final lining of hair, mixed in one case with red moss fructifications."

As will be seen from the above, they are late breeders, and few birds lay before the 20th July, while others do not lay until the middle and end of August. In Whympers' magnificent series of eggs, now in my collection, two out of every three clutches consist of four eggs, the third being of five, except in one case, which is a three. A. E. Osmaston records, however, all his nests as containing three eggs only, perhaps incomplete clutches.

They are quite typical Rose-Finch eggs, rather deep-blue-green, or turquoise blue, scantily but boldly spotted with black, a few eggs also having a broad streak or hieroglyphic. Very rarely

an egg may be spotless or very nearly so, but I have never seen all the eggs of any one clutch unspotted. The texture is fine but not very close and the surface has a soft satiny sheen but no hard gloss.

In shape the eggs are broad ovals, sometimes rather pointed.

One hundred eggs average 19.5×14.6 mm.: maxima 21.2×15.0 mm.; minima 17.6×14.0 and 18.7×13.6 mm.

(1060) *Propasser pulcherrimus davidianus* * (Milne-Edw.).

THE CHINESE BEAUTIFUL ROSE-FINCH.

Propasser pulcherrimus davidianus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 127.

This Eastern race of the Beautiful Rose-Finch breeds from Eastern and Southern Tibet to Sinling and Shensi. It occurs in Bhutan and may breed in that country on the borders of Tibet and, perhaps, also in the Northern Abor country, North of the Brahmapootra.

It is an extremely common bird all over the Tibetan plateaux between 12,000 and 16,000 feet, where it breeds in June, July and August, making its nest, like the preceding bird, in low thorny bushes. Capt. R. Steen was the first to take its eggs, near Gyantse, and since then Capt. Kennedy, Capt. Macgregor and many others have taken them.

Macdonald sent me a series of eggs, nests and skins and, with them, the following summary on the nidification:—"This bird is very common all round Gyantse, where I live, at 12,000 ft., and all round about wherever there are great plains with thorn-bushes, while it is also found on the slopes round these hills, nesting at much greater heights. Once when I went to Lhasa I saw great numbers of these birds, but this was early in the year, and they were then in large flocks. The nests are cups, made mostly of grass but, in a great many, roots, bits of bark and a few twigs are mixed with the grass, and in a few I have seen the outer walls were nearly all roots and twigs. The lining is made of goat's hair, yak's hair or some kind of fur, like that of the little rat which burrows all over the plains. They never use feathers to line their nests with. The nests are quite well made, the walls being strong and well put together and the lining ample and soft. They are always placed low down in thorny bushes or brambles, sometimes almost on the ground and at other times a couple of feet above it. Next to the thorny little bush which is so common all over Tibet the favourite sites for the nests are tangles of brambles and wild roses."

* I still cannot separate Sharpe's *wakoni* from this race from China, although it has again been said by some systematists that they are separable.

Ludlow says that "it breeds abundantly in thorny 'Hippophoe' bushes on the Gyantse plain in July, building a neat nest of grass and lining it with hair."

I have eggs taken, by Steen and his successors, between the 12th June, which is exceptionally early, and the end of August.

The eggs vary from three to five in a full clutch and cannot be distinguished from those of the preceding bird, but a bigger percentage are unspotted, and I have one clutch of which all five are unmarked blue.

One hundred eggs average 19.9×14.2 mm. : maxima 22.0×14.3 and 21.0×15.0 mm. ; minima 17.9×13.1 mm.

I have been able to gather little more information about their habits. The birds sit very close, the female, who does all the work of incubation, having to be almost kicked off the nest.

Macdonald says he thinks the eggs take 12-13 days to hatch.

Propasser rhodochlamys (Brandt).

THE RED-MANTLED ROSE-FINCH.

(1061) Propasser rhodochlamys grandis (Blyth).

THE SIMLA RED-MANTLED ROSE-FINCH.

Propasser rhodochlamys grandis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 123.

This Rose-Finch is found over the whole of the Himalayas from the frontiers of Afghanistan and Baluchistan, through Kashmir, to Kumaon and Garhwal, and has once occurred in Sikkim.

It undoubtedly breeds in Northern Kashmir, possibly between 13,000 and 16,000 feet elevation, but the only record of its breeding is that of Meinertzhagen (Ibis, 1920, p. 139). He writes, in an article on the Birds of Quetta :—"A fairly common resident in the hills up to 11,000 feet, descending lower in winter.

"A nest with two eggs was found at 9,500 feet on 3. v. and another with four eggs at 11,000 on 10. v. Fully-fledged young being fed by their parents were noted on 7. vi. The nests were in wild briars three and five feet from the ground, were cup-shaped and made of grass and bark, lined with fine fibres and a few hairs. Eggs pale blue, with a few evenly distributed brown spots."

(1062) Propasser rhodochrous (Vigors).

THE PINK-BROWED ROSE-FINCH.

Propasser rhodochrous, Fauna B. I., Birds, 2nd ed. vol. iii, p. 129.

This very handsome little Rose-Finch is distributed over the Himalayas from Kashmir to Nepal and Western-Sikkim, as Stevens

records it from Tonglo (Journ. Bomb. Nat. Hist. Soc. vol. xxx, p. 370, 1925).

It breeds from 10,000 feet upwards, certainly as high as 13,000 and probably up to 15,000 feet, at which height birds have been observed in July and August when they must have been breeding. Osmaston in Kashmir at 12,000 feet and Whympers in Garhwal at 11,000 to 13,000 feet found them breeding both in the open bush and juniper-clad slopes and the highest-growing forests of Silver-fir and birch, where the trees were becoming stunted and scanty but the undergrowth thick.

The earliest note I can find on the taking of the nest is that of Buchanan (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 132, 1903). He records:—"I found two nests of this bird in the first week in August [Sonamurg] at an elevation of 10,500 feet. The nests were cup-shaped, made of twigs and grass, and lined with horse-hair. They were placed three or four feet from the ground in bushes; the eggs, four and five in number respectively, are a bright blue with a few large black spots, chiefly at the larger end."

A still briefer note by Whympers is given in the same journal (vol. xx, p. 1150, 1911), but I have a grand series of the eggs taken by him with many notes which give a fuller idea of the nidification. The data, collected from odd letters, data-tickets, etc., may be summarized as follows:—

"The Pink-browed Rose-Finch breeds wherever it is found from the latter half of July to the end of August. I have taken nests and eggs above Sonamurg in Kashmir at about 11,000 feet, at Phurbia and the Pindari Glacier in Kumaon 11,000 and 13,000 feet, and again in the Nila and other lofty valleys of Garhwal at approximately the same height but generally above 12,000 feet. The nests are very much like those of the Beautiful Rose-Finch and are placed in similar positions but, whereas this bird prefers low thorny bushes to anything else, the Pink-browed Rose-Finch, though it often uses these for its nest, seems to prefer juniper-bushes. I have also taken its nest from rose-bushes. The nest is a rather deep cup made of dry grass bents and a very little moss and lined with horsehair; sometimes a few twigs and roots may be added to and mixed with the grass and sometimes the lining may be of some other kind of hair or fur. They are placed low down, nearly all those I have seen being built under two feet from the ground and, occasionally, within a few inches of it. Nests and eggs are, I think, quite indistinguishable from those of the Beautiful Rose-Finch, but both these birds sit so close and are so tame that it is almost invariably easy to identify the hen on the nest.

"They lay four or five eggs, exactly like those of *pulcherrimus*."

To the above I can add little. The eggs, as Whympers says, are the same deep blue with black spots as are those of the Beautiful Rose-Finch, but they average a good deal smaller and are, on the whole, a trifle broader in proportion.

One hundred eggs average 18.8×14.2 mm. : maxima 21.2×14.8 and 20.6×15.0 mm. ; minima 17.3×13.6 and 17.9×13.3 mm.

Osmaston, it should be noted, once took a clutch of six eggs in a nest built "in *Lonicera* bush in very open silver-fir forest with plenty of undergrowth, 3' from the ground, composed of dry grass and weedstems and lined hair."

(1063) *Propasser rodopeplus* Vigors.

THE SPOTTED-WINGED ROSE-FINCH.

Propasser rodopeplus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 130.

So far this fine Rose-Finch is known to occur on the Outer Himalayas from Musoorie to Sikkim. All that is recorded to date about the nidification of this bird is that Whympers in 1910 found the bird, evidently breeding, on the Pindari glacier in Kuman, though he failed to obtain the nest and eggs. Later, in July 1912 and August 1913, Tulla Ram, his trained and very trustworthy collector, took three nests with five, four, four eggs respectively which he sent together with the parents to Whympers. The eggs were taken on the 26th July (2 clutches) and 24th August and were all quite fresh.

In appearance they are like all other Rose-Finches' eggs of the blue ground, black-spotted type, but one clutch has three out of four eggs spotless. They are, of course, very large. Thirteen eggs average 22.1×16.3 mm. : maxima 23.8×17.0 and 23.0×17.1 mm. ; minima 21.0×16.0 mm.

Propasser edwardsii (Verr.).

THE LARGE ROSE-FINCH.

(1064) *Propasser edwardsii saturatus* Blanford.

THE NEPAL LARGE ROSE-FINCH.

Propasser edwardsii saturatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 131.

The range of this bird is from Nepal to Eastern Assam and Tibet.

In 1915 Macdonald sent me two skins of this Rose-Finch with nests and eggs taken in July of that year, but the latter arrived in fragments. In 1916 he sent me two more clutches of four eggs but no skins, and the following letter:—"The two clutches of big blue eggs, not quite so big as the very large ones I also send you, are of the same sort of bird of which last year I sent you skins and which you told me arrived all broken. They were taken by the chowkidar of the rest house, who took the others, who brought them in to me immediately he got them together with

the birds, but as my son was not with me I could not have them skinned and they went bad. You can, I think, identify them from last year's skins. The nests were just like those of the little Rose-Finch (*dauricus*) which is so common here, but of course they were larger and wider. They were lined with antelope hair but I cannot say what kind. The elevation was about 14,000 feet."

A third clutch of five was taken on the 27th July, 1917, and sent to me. This was said to have been taken at 15,000 feet and the nest to have been lined with musk-deer hair and, "like the others," built "low down in bushes, ? wild rose."

The eggs are like those of *Propasser rodopeplus* but easily separable from them by their pale colour. In addition to the sparse primary spots of black there are a few secondary ones of deep grey.

Thirteen eggs average 23.1×16.8 mm.; maxima 24.3×15.9 and 22.0×17.9 mm.; minima 22.0×16.7 and 24.3×15.9 mm.

Carpodacus erythrinus (Pall.).

THE COMMON ROSE-FINCH.

(1068) *Carpodacus erythrinus kubanensis* Laub.

THE CAUCASUS COMMON ROSE-FINCH.

Carpodacus erythrinus kubanensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 136.

The breeding limits of the various races of the Common Rose-Finch are difficult to define. The present form breeds in the Caucasus, Asia Minor, Altai, and Turkestan. In Afghanistan, Gilgit and Northern Kashmir the breeding bird is nearer this subspecies than it is to the darker bird breeding on the Outer Himalayas and must be retained under the name *kubanensis*.

Biddulph took many nests of this Rose-Finch in Gilgit, writing of them to Hume as follows:—"Several nests were found, all situated within a foot of the ground, either in low bushes or among the stems of coarse grass about 2 feet high in scrub-jungle. The nest is a neat cup-shaped structure of grass, lined with the finer roots and stems only, except in one instance, in which a good deal of hair is mixed with the lining; the interior is from 2 to $2\frac{1}{2}$ inches wide and $1\frac{1}{2}$ deep.

"Nests were taken at 10,000 feet elevation between July 16th and 30th, all with eggs mostly fresh."

Wardlaw-Ramsay shot a male "in the Kurum Valley, apparently breeding."

Whitehead says that in the Summer he found this Rose-Finch "abundant in several valleys of the Safed Koh from 6,500 to 8,500 feet." Here he took a fine series of nests and eggs in the

Khagan Valley but all from 8,500 to 10,000 feet elevation. Later Harington also took several nests at Bultakundi at about 9,000 feet. All these eggs are now in my collection and the notes on the data-tickets give the following details:—"The birds breed in scrub jungle or open hill-sides covered with coarse grass, small bushes and boulders. The nests are fairly neat strong cups formed of twigs, or twigs and grass lined with roots and hair. They were placed low down and all in small bushes, chiefly 'Janulla' and roses and occasionally in a tuft of grass. The female sat very close, in one case almost allowing herself to be caught on the nest.

"The breeding season is from the end of June to the middle of August, but they do not normally have two broods, though, if the first set of eggs be taken they at once build again and lay another clutch."

The eggs number four or five, most often the former, though Harington once took seven eggs from a nest. These, however, undoubtedly formed two clutches, for there were three undersized addled eggs and four ordinary-sized fresh ones.

The eggs are just the normal black-spotted blue eggs of the other Rose-Finches, unspotted eggs being not uncommon.

Fifty eggs average 20.4×15.0 mm.: maxima 23.2×14.8 mm. and 21.1×15.5 mm.; minima 18.7×14.8 and 19.1×13.2 mm.

(1069) *Carpodacus erythrinus roseatus* (Hodgs.).

THE INDIAN COMMON ROSE-FINCH.

Carpodacus erythrinus roseatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 137.

Hodgson's Rose-Finch, as this bird has hitherto been called, breeds in great numbers from Ladak to Garhwal and thence Eastwards to Southern Tibet, Sikkim, South-East Tibet and the West Chinese mountains.

It is a bird of rather higher elevations than the preceding form. Whympor obtained nests in Kuman and Garhwal between 11,000 and 12,000 feet, while Osmaston took many in Ladak between 10,500 and 12,600 feet.

It breeds both in the thin Birch and Silver-fir forest in their extreme upper limits and in open country, sometimes in very exposed positions, as, for instance, on the ridges leading to Changail in Tehri Garhwal. The nest may be placed in almost any kind of low bush between eighteen inches and four feet from the ground, but the birds generally select thorny ones in which they are well concealed. Osmaston found one nest in dwarf willow scrub about five feet from the ground. The nest is just like that of the preceding bird, but both Whympor and Osmaston noticed that some nests were built completely of fine grass and were lined with fine roots with no admixture of hair or wool.

They breed during June, July and August, most birds laying in the latter half of July. I have eggs in my series taken from the 4th June to the 28th August.

The number of eggs laid is nearly always four. Rarely three only are incubated, and I once had a five sent me from Tibet.

The eggs cannot be distinguished from those of *C. e. kubanensis*, but spotless blue eggs are extremely rare, while a large proportion are marked with brown spots instead of black and others have distinct secondary blotches of pale brown and grey. In quite a number of eggs the markings form fairly well defined rings. In shape they certainly average longer and are a little more pointed in proportion.

One hundred eggs average 20.8×14.5 mm. : maxima 23.3×14.0 and 21.4×16.0 mm. ; minima 18.7×14.5 and 22.1×13.7 mm.

***Carpodacus rubicilloides* *.**

THE GREAT ROSE-FINCH.

(1070) *Carpodacus rubicilloides rubicilloides* Przew.

THE KANSU GREAT ROSE-FINCH.

Carpodacus rubicilla rubicilloides, Fauna B. I., Birds, 2nd ed. vol. iii, p. 138.

Carpodacus rubicilloides rubicilloides, ibid. vol. viii, p. 654.

Apparently this Rose-Finch, the type of which is described from Kansu, occurs in Southern Tibet, East to Kansu, breeding in great numbers over the greater part of that region. It occurs, and may breed, in Sikkim and Yunnan.

As regards the type of country in which these birds breed I can find but little recorded, but Meinertzhagen says it seems to prefer even more desolate, arid country to that which attracts *C. severtzovi*.

A big series of this bird's nests, eggs and skins were sent me by John Macdonald, whom I had sent to Hramtso to try to obtain eggs of *Larus brunneicephalus*. According to him the birds were breeding on the sloping, stony hills and plateaux round Hramtso and on the hills above Gyantse at about 14,000 feet, and he obtained nests with fresh eggs, going and returning, from the 30th June to the 30th July. No nests were obtained on the Gyantse plateau. The nests were taken from varying positions, most being built

* The status of *C. rubicilla* and *C. rubicilloides* is still very difficult to understand, but the question has been gone into by Ticehurst (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 346, 1926) and by Meinertzhagen (Ibis, 1927, p. 384, and Bull. B. O. C. vol. xlvi, p. 83, 1926). For the present I accept their conclusions as to their specific rank but, as *rubicilloides* is described from Kansu, Meinertzhagen's *lucifer* is a synonym of that bird, as I cannot separate the South Tibet birds from them.

low down in thorny bushes, well concealed and only a foot to three feet from the ground. Some were built in Rose-bushes and higher, rather straggly bushes, in one case 8 feet from the ground, while another was placed in among the masses of twigs growing from the crown of pollarded Willow.

The nests sent me were rather loosely put together deep cups made principally of fine twigs, coarse roots and grass, but two of them had leaves and wool mixed in with the twigs, and one had a good deal of dead moss. All were densely lined with wool and hair, the innermost lining being of the latter only. They had been knocked about a good deal in transit but they probably measured about 7 inches in diameter by 3 to 3½ inches deep externally, the egg-cavity being about 4 by 2 inches or less.

The full clutch of eggs numbers four or five, most often the latter.

In appearance they are quite typical of the genus, a beautiful blue, slightly tinged with green and with a few specks of black at the larger end and sometimes one or two fine twisted hair-lines of the same. On the whole they are less well spotted than eggs of either *C. r. lapersonnei* or *C. r. severtzovi*; on the other hand I have seen no unspotted eggs such as sometimes occur in both of these. In shape they are rather long pointed ovals, with a fine sheen but no hard gloss.

Thirty eggs average 23.6×16.7 mm.; maxima 25.8×17.0 and 23.0×17.4 mm.; minima 21.6×17.0 and 24.5×15.9 mm.

(1070 a) *Carpodacus rubicilloides lapersonnei* Meinertz.

THE LADAK GREAT ROSE-FINCH.

Carpodacus rubicilla rubicilloides, Fauna B. I., Birds, 2nd ed. vol. iii, p. 138 (part.).

Carpodacus rubicilloides lapersonnei Meinertz., Bull. B. O. C. vol. xlv, p. 83, 1920.

This seems to be a North-Eastern form of the Kansu Great Rose-Finch, being extremely common in Ladak and adjoining Tibet, but *not* occurring in South Tibet, where the birds seem nearer to the typical race from Kansu.

The first nests and eggs of this bird were taken by Major Corbett and sent home to Dresser with two birds, and Dresser (Ibis, 1904, p. 109) points out that the birds are intermediate in colour between true *rubicilla* and *severtzovi*.

We have an excellent account¹ of this bird by Osmaston (Ibis, 1925, pp. 690-692), which I quote in full:—"This species is common throughout Southern and Eastern Ladakh between 12,500 and 15,500 feet wherever Tama bushes or any other shrubs occur.

"They were first observed in the Tama scrub near the Tso Moriri Lake at about 15,000 feet on the 19th June, and during the next ten days or so they were seen building at every camp.

"The song of this bird is very poor. It consists of two notes only, the first being higher in the scale.

"This species is not found near Leh, nor, indeed was it seen anywhere North of Leh.

"Large shrubs or even willow-trees are preferred as nesting sites, and nests were found up to 15 feet from the ground. As, however, trees and large shrubs are, as a rule, scarce, while the Tibetan furze is exceedingly common, the majority of nests are in furze-bushes.

"In the Puga Valley, at an elevation of from 13,500 to 14,000 feet, many old nests of this species were found in which dead hen birds were sitting. These dead birds did not all belong to this species. There were also dead Twites and Hedge-Sparrows. The birds had evidently died the previous summer but, owing to the dryness of the climate, they had not decomposed, but had simply dried up! The cause of death was not apparent, but it may possibly have been due to cold—an untimely blizzard, similar to one experienced by me on 12 July, would perhaps account for it.

"In the first ten days of July many nests were found, mostly containing fresh eggs. They were rather massive structures made of small sticks and twigs, followed by a layer of dry grass, and lastly a lining of wool and hair. Five eggs are generally laid, but four or even three incubated eggs may be found. The hen bird sits very close, and will almost allow herself to be caught on the nest.

"Eggs are a rather deep blue, marked rather sparingly with a few large black spots.

"The following is a statement of nests found :—

- "June 19. Tso Moriri, 15,000 feet. Building.
- " 24. Puga, 14,500 feet. Several pairs building.
- " 26. Below Puga, 13,500 feet. Many pairs building.
- " 27. Nimu, 14,000 feet. Building.
- " 30. Ralma, 14,000 feet. Building.
- "July 1. Tsakjung, 14,800 feet. Many pairs building. First egg found.
- " 2-6. Shushal, 14,200 feet. Seven nests with eggs (two to five fresh eggs in each nest).
- " 7. Takkung, 13,900 feet. Many building, six with eggs.
- " 8. Merak (Pangong Lake), 13,900 feet. Five nests with eggs.
- " 9. Man (Pangong Lake), 14,000 feet. Three nests with eggs.

"From July 10 our course was mainly at lower levels, and this species was only occasionally seen. The eggs taken varied in length from 27.2 to 22.2 and in breadth from 19.0 to 16.2, the average of ninety eggs being 24.1×17.6 ."

In 1931 Mr. A. B. Duncan obtained a further series of the nests and eggs of this bird round Puga in Ladak at a height of about

14,000-15,000 feet, all built in Caragana scrub. He obtained many clutches of eggs between the 5th and 8th July.

Thirty-four eggs measured by myself average 23.7×17.1 mm.: maxima 25.7×18.0 mm.; minima 22.0×16.0 and 25.0×15.9 mm.

***Carpodacus rubicilla* Gülden.**

THE CAUCASUS GREAT ROSE-FINCH.

(1071) *Carpodacus rubicilla severtzovi* (Sharpe).

THE TURKESTAN GREAT ROSE-FINCH.

Carpodacus severtzovi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 139.

Carpodacus rubicilla severtzovi, ibid. vol. viii, p. 654.

This grand Finch is very common in South and East Tibet, extending through Ladak and Kashmir into Turkestan and breeding at 12,000 feet up to at least 15,000 and probably higher.

The first record of this bird's nest and eggs is that of Dresser (Ibis, 1900, p. 342), who describes some sent home to him by Capt. R. Steen. Of the nest, which was taken on the 1st August at Kangma, 30 miles from Gyantse, Dresser remarks:—"It consisted of dry grass and roots with a thick lining of hair; it was placed on a low bush about a foot from the ground, and contained four almost fresh eggs. These low bushes grow about the edges of the small fields at the foot of the nullahs."

Ludlow found this Finch around Gyantse but records all the breeding birds taken by him as *C. r. lapersonnei*. On the other hand some mangled specimens sent to me by Macdonald with eggs were all, undoubtedly, *severtzovi*, though a few clutches from the Northern hills were of *C. r. rubicilloides* and not of Meinertzhagen's Ladak race so far as I could tell.

Steen, Kennedy and many others have sent me series of this Finch's eggs, often with skins of the birds, which had been shot off, or trapped on, the nests. The following is a summary of their notes:—

"The birds are exceedingly common all over the Gyantse plateau and also on the hills all round between 13,000 and 15,000 feet. They are also equally common at Yatung, Phari and other places in Southern Tibet.

"The birds breed both in the desert plateaux when there is sufficient cover in the way of Tibetan furze, gorse, Caragana bushes or Juniper. They also breed in bush and Willow cover by stream sides and by irrigation ditches running through or beside cultivated fields. In fact a low thick bush in almost any position or in any kind of country may hold a nest of this bird. They may be anything from a deep cup to a wide shallow one and are made principally of coarse grass and roots lined densely with hair. In a few instances leaves and supple twigs are mixed with the grass

and sometimes tufts of hair and wool are also worked in with it. Almost invariably, however, grass forms the major part of the materials used instead of twigs as in the nests of *C. rubicilloides*. The lining is sometimes of wool instead of hair and sometimes of the two mixed, while it is always thick and well matted. Measurements of nests are between $5\frac{1}{2}$ and $6\frac{1}{2}$ inches in diameter but they vary greatly in depth. One nest sent to me for examination was barely 2 inches deep whilst another was over 4. The cavity for the eggs is somewhere about four inches wide and anything from 1 to 3 in depth.

"As a rule the nest is built between one and three feet from the ground, but occasionally it may be placed in the crown of a pollard willow six or seven feet up.

"The breeding season is June, July and August, most birds laying in the latter half of July and the early part of August."

This bird breeds in Ladak in the same country as that in which *C. r. lapersonnei* breeds, and Osmaston took nests of both species at Shushal, the latter on the 5th and 7th July, and *severtzovi* on the 6th. Of the two nests taken by him on the 6th one was built in Tibetan furze, 3 feet from the ground, and the other in a Willow about 8 feet up.

The eggs in a full clutch number four or five and are of the usual deep blue-green, sparsely but boldly spotted at the larger end with black or, rarely, with reddish-black. The secondary spots, if present, are of deep lavender. I have one clutch of five eggs which are spotless and another of the same number which is marked with tiny specks, long lines and tiny hieroglyphics.

Eighty eggs average 24.0×17.0 mm.; maxima 28.8×18.3 and 24.9×18.7 mm.; minima 21.9×17.1 and 25.0×16.7 mm.

***Bucanetes githaginea* Licht.**

THE DESERT-FINCH.

(1072) ***Bucanetes githaginea crassirostris* (Blyth).**

THE EASTERN DESERT-FINCH.

Erythrospiza githaginea crassirostris, Fauna B. I., Birds, vol. iii, p. 141.

Bucanetes githaginea crassirostris, ibid. vol. viii, p. 655.

This Desert-Finch breeds in Afghanistan, Baluchistan and the mountains of the North-West Frontier. Tomlinson also obtained it breeding at Ahwaz in Mesopotamia in March.

Williams found this bird breeding at Quetta and records the finding of the nest as follows (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 604, 1929):—

"This is a rare bird in the Quetta valley but breeds freely in the Pishin valley, making its nest among the rocks and, I am informed, in the trenches where the vine is cultivated.

" My first nest was found at Sheikh Mundah, on the 14th May 1924, and two other nests have subsequently been taken in the Quetta valley (on the 25th May 1926), and the bird secured in both the latter instances.

" As regards the first nest, as soon as the female flew from it I knew that it was not *R. obsoleta* which is so common round Quetta, and when the male bird came on the scene my companion pointed out the differences. The pink breast of the male and the ashy hue of the female are easy distinctions from *R. obsoleta*, and the owners of the nest were, without a doubt, a pair of *E. g. crassirostris*.

" The first nest was in an old deserted building, placed between two laths going across a beam, and was a framework of thin sticks and twigs, lined with wool and hair. The other two were also placed in a ruined building, a watch-tower, and were placed in broken patches of the crumbling mud walls. The nests were of the same type.

" The eggs, four in number, are broad ovals, slightly glossy, and in colour a clear pale blue with a few black spots at the large end."

In the Syrian Desert Aharoni found these Finches breeding in February and March, making their nests in holes in, or under, rocks.

In Quetta Williams took one nest on the 25th of April, his other nests in May.

The eggs vary considerably, the ground varying from a skim-milk blue, with a few dark spots or faint red freckles at the larger end, to a blue almost as deep as that of a Hedge-Sparrow's egg, with a well-defined ring of reddish freckles at the broader end.

Fourteen eggs, including all Williams's, average 18.4×14.7 mm. : maxima 18.7×14.7 and 18.6×15.1 mm. ; minima 18.2×14.2 mm.

In shape the eggs are broad ovals, some being decidedly pointed at the small end. The texture is fine and close, the surface having a slight sheen.

(1074) *Rhodospiza obsoleta* (Licht.).

THE LARGE-BILLED DESERT-FINCH.

Rhodospiza obsoleta, Fauna B. I., Birds, 2nd ed. vol. iii, p. 143.

Lichtenstein's Finch, as this bird has hitherto been named, is found from Palestine to Mongolia breeding South into Baluchistan, where it is very common all round Quetta.

The first record of its breeding in Quetta is that of General R. M. Betham (Journ. Bomb. Nat. Hist. Soc. vol. xvi, p. 748, 1906), while later Williams (*ibid.* xxxiii, p. 604, 1929) gives further details of its nests and eggs. Both these gentlemen have given me fine

series of its eggs and abundant notes, from which I compile the following :—

This Rose-Finch is one of the most common birds in Quetta in Spring and Summer, a few birds remaining all the Winter, though the majority seem to leave. They arrive in the end of March and leave again in September, and between these months are to be found at all heights above 5,000 feet in great numbers and in smaller numbers a little below this. They are cheerful, confiding little birds, and Williams says that their note "pink-pink-pink" is to be heard all over the cantonments at Quetta during the breeding season. They nest in the gardens, by the road-sides and everywhere on the Quetta plateau and surrounding hills where there are tall bushes and trees on which to place their nests.

The nests are very easy to find, as no attempt seems to be made to conceal them, though some which are wedged into stoutish forks or placed on larger branches may not be so conspicuous as most of them. They may be placed at any height from the ground between three and fifteen feet, but the majority will be taken from between six and twelve feet up on small trees, those beside roads being especially favoured. Occasionally the nest is placed in a hush with thick foliage low down, but this seems to be quite exceptional.

The nests are rather deep cups, the outside consisting of twigs and small sticks fairly strongly and compactly put together, but not very tidily. In some nests the twigs are mixed with grass, roots, and other materials and, in all nests, there is a wall composed of grass between the outermost twigs and the true lining, which is sometimes mixed with wool, feathers, small leaves etc., and then the final true lining of wool and hair, this being generally well matted together, sometimes almost making it into felt. Feathers, cotton, string and small rags are often well worked into the lining, while Currie found one nest in Persia "made almost entirely of scraps of string, cotton and shreds of cloth, mixed with a large amount of vegetable down to which the seeds were still adhering; diameter 6" one way, 4" the other and about 2" deep, with a comfortable deep hollow for the eggs."

Most nests are smaller than this, being about 5 inches only in diameter, the egg-cavities being about 3 inches across by less than 2 deep.

The birds commence to lay during the end of April, and most have laid and are sitting by the third week in May. Eggs may, however, be found until late in July, and some pairs may have two broods. The earliest date recorded is 24th April (Betham) and the latest 17th July (Williams). In Persia Currie found nests with eggs throughout May and June.

The birds lay five or six eggs, occasionally seven, while, on the other hand, four eggs only are sometimes incubated.

As a series there is not great variation. The ground ranges from white to a pale blue, most eggs being of the colour of skim milk, while the spots, always scanty, run from deep red-brown, which is rare, to black, which is normal. The markings are always small, consisting of spots the size of a pin's head and sometimes far smaller still; in most eggs they form an ill-defined ring at the larger end and are sparse or even absent elsewhere. In a few eggs there are also twisted hair-lines, of the same colour as the spots and nearly always confined to the ring.

One hundred eggs measured by myself average 18.9×14.2 mm. : maxima 22.2×15.0 and 20.4×15.1 mm. ; minima 17.4×13.0 mm. Williams gives the average of forty eggs as 19.2×14.4 mm., and his biggest as 22.8×14.7 mm.

Procarduelis nipalensis.

THE DARK ROSE-FINCH.

(1076) ***Procarduelis nipalensis nipalensis* (Blyth).**

THE NEPAL DARK ROSE-FINCH.

Procarduelis nipalensis nipalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 146.

This handsome Rose-Finch is found from Kashmir and Kuman throughout the Outer Himalayas as far East as the mountains North of Sadiya in Eastern Assam.

In 1912 Whympers noticed this bird, evidently breeding, on the Pindari Glacier in Garhwal between 12,000 and 14,000 feet, but failed to find its nest. In August 1913 Tulla Ram, Whympers's native collector, and a most reliable man, was sent to the same glacier and succeeded in finding one nest with three eggs which he forwarded to Whympers. The nest was said to have been taken in "Ringall Jungle" at about 14,000 feet in the second week of August.

The three eggs are like large and very handsomely marked Swallow's eggs. The ground is white and they are blotched and spotted with primary markings of rich red-brown and with secondary ones of pinkish-lavender. These are numerous at the larger end, where in one egg they form a ring, becoming more scanty towards the smaller end. In the egg with the ring the blotches are of some size and considerably larger than they are in the other two. In shape the eggs are long pointed ovals. The texture is comparatively coarse and not very close, the surface being quite glossless.

They measure 22.9×15.1 , 22.2×15.3 and 22.3×15.3 mm.

The male and female owners of the nest taken by Tulla Ram were both sent to Whympers with the eggs.

Carduelis caniceps.

THE HIMALAYAN GOLDFINCH.

(1081) *Carduelis caniceps caniceps* Vigors.

THE SIMLA HIMALAYAN GOLDFINCH.

Carduelis caniceps caniceps, Fauna B. I., Birds, 2nd ed. vol. iii, p. 150.

This form of the Himalayan Goldfinch extends from Gilgit, through Kashmir, to Kuman, the Garhwal Hills and Simla States.

Occasionally this Goldfinch breeds as low down as 5,000 feet, at which level Rattray took its nest near Murree, though most birds were breeding in the Galis at 7,000 feet upwards. Round Srinagar, also, many collectors have taken nests between 5,000 and 7,000 feet, but for the most part it breeds upwards of 7,000 feet and up to nearly 14,000 feet. In Ladak Osmaston records it breeding between 9,000 and 11,000 feet.

They nest principally in Pine-woods and other forests, but sometimes in quite small spinneys and occasionally in single trees in orchards and open country, such nests having been taken by Ward, Buchanan and Rattray. Very often they breed in company. Rattray, writing to me of birds breeding in Kashmir, remarks:—"As for *C. caniceps*, all the birds seem to collect and breed in company, sometimes two or three pairs making their nests in the same tree. I suppose 200 pairs were breeding in the Takth-i-Saliman; this patch of trees was about three acres only in extent, while all round was bare hill-side. The place was well known to the Kashmir trappers." Again of another place he writes: "at Srinagar all nests were in a small Pine-wood of about 5 acres, on N. side of bare hill-side of Takth-i-Saliman, while at Sonamerg also they were collected together."

In 1903 Buchanan took many nests from these same two small Pine-woods.

The favourite site for building is undoubtedly a Pine-tree at any height from five to twenty-five feet from the ground. Rattray remarks of some nests taken by him:—"Sometimes the nest is placed in a tuft of pine-needles right at the end of a branch of the Pine (*Pinus excelsus*), but more often in a mass of twigs four or five feet from the end. When in the thick foliage they are naturally hard to see, but when placed on a thin branch free from needles, as is often the case, they are quite easy to make out."

They do not, however, always nest in Pines, and Osmaston in Ladak found nests at 9,500 feet "in a small sapling, 7 feet from the ground," another "in a high bush about five feet from the ground," and others, again, "in willows 8 feet up."

The nests are exactly like those of our English Goldfinch, beautifully made compact little cups about $3\frac{1}{2}$ inches across the

top by about 2 deep, the egg-cavity being little more than 2 by $1\frac{1}{4}$ inches. The materials used vary considerably but, for the most part, moss, lichen, soft vegetable fibre and the finest of grasses and supple twigs form the body of the nest, while they are lined with a felted pad and sides of the softest vegetable down.

Osmaston describes two nests taken by him as "neatly and beautifully constructed of dry whitish fibre mixed with a little pale green vegetable matter and lined with fine white cottony down (willow down) with a little hair."

Davidson describes others taken by him in the same wood at Takth-i-Saliman above referred to as "lovely, very solid cups of moss, with a few roots interwoven."

In a few nests there is a good lining of hair above the pad of cotton-down, and in others the lining is of hair and cotton-down mixed together. In a few nests a little wool may be used both outwardly and inwardly, and I have seen two nests with a few tiny feathers worked into the outer walls.

The breeding season lasts from the second week in May and all through June into early July, while Osmaston took two clutches of eggs at Paskium in Ladak on the 3rd August.

The birds lay from three to five eggs, three very seldom, five quite often.

The eggs are exactly like those of an English Goldfinch, very delicate, transparent little eggs with a white ground faintly tinged with blue or blue-green or, very rarely, with pink, though this latter tint always seems to fade away very quickly. The markings consist of scanty specks or spots of light reddish to deep red-brown, confined almost entirely to the larger end. I have one clutch marked with exceptionally dark spots with which there are mixed numerous twisted lines, these also occasionally showing in smaller numbers on other eggs. Some eggs are spotless, though I have never seen a complete clutch unmarked.

Sixty eggs average 18.5×13.2 mm.: maxima 19.4×12.8 and 19.0×13.9 mm.; minima 16.8×13.2 and 17.9×12.2 mm.

(1082) *Carduelis caniceps subulata* Gloger.

THE CENTRAL ASIAN GOLDFINCH.

Carduelis caniceps subulata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 151.

I cannot myself differentiate between Sarudny's *subcaniceps* and the present bird but, to those who can, the bird breeding on our North-West Frontier would have to bear Sarudny's name.

Accepting *paraponisi*, *subcaniceps* and *subulata* as one and the same bird, we have a breeding range which extends from Transcaspia and the provinces of Yenesei, Tomsk and Baikal in Siberia to Persia, Afghanistan and Baluchistan.

Within our limits it has been found breeding in the Kurram Valley by Whitehead, who remarks (Ibis, 1909, p. 230) :—" Capt. Keen tells me that a few stayed there all through the summer, and he believes nested in the neighbourhood.

" We also observed a few in the Upper Kurram Valley in spring and summer."

Later, on the 3rd July, 1912, Whitehead obtained a nest and three eggs, which are now in my collection and which he records in his notebook as follows :—" (165 C. c. 3) Barawsi, 10,900 feet. Nest and eggs typical, former placed 20 feet up in Pencil Cedar, near end of branch. 3.7.12. C. N. T. Whitehead."

Fulton says (Journ. Bomb. Nat. Hist. Soc. vol. xvi, p. 53, 1905) :—" Very common (in Chitral) in summer but not resident in winter. Arrives in April in large numbers, and breeds in the country. I watched a pair building in the Rah-Roshan Valley at 12,000 feet (12th July). The nest was placed in the fork of a small birch about 4 feet from the ground and, although incomplete, was similar to that of the European Goldfinch."

Finally Williams found it breeding at Quetta. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 605, 1929) :—" This Goldfinch is a local migrant retiring to the hills to breed. A few pairs, however, remain to breed in Quetta itself, as two pairs of adult birds were constantly seen in, or in the vicinity of, our garden, and in the late spring were seen feeding young, though we had not the luck to locate the nest.

" The nearest to Quetta where they breed with any degree of frequency is the Takata Range, above an altitude of 8,000 feet, among the Juniper-covered slopes of this and the neighbouring ranges."

(1083) *Callacanthis burtoni* Gould.

THE RED-BROWED FINCH.

Callacanthis burtoni, Fauna B. I., Birds, 2nd ed. vol. iii, p. 152.

The breeding range of this handsome Finch extends from Chitral to Nepal, and probably to Sikkim, at elevations between 8,000 and 10,000 feet, though very little is on record about its nest and eggs.

Whitehead found it not uncommon in Chitral, between 9,000 and 10,000 feet, during the breeding season, but failed to find its nest. The first record of its breeding is that of A. E. Ward, who writes (Journ. Bomb. Nat. Hist. Soc. vol. xviii, p. 463, 1908) :—" The Red-browed Finch breeds in Kashmir. The nest was very small, composed almost entirely of the spines of the blue pine, and was in a big fir-tree; it was found at an altitude of 9,000 feet at Kolahir. The eggs are a rather short oval, $\cdot 88 \times \cdot 65$ inches, and of a greenish blue marked with very dark brown spots at the thick

end. A second nest was being built, but apparently was forsaken by the birds; this also was in a large fir."

Possibly the above nest was an abnormal one, as the only two others of which I have any record were very unlike it in construction.

Rattray in a note sent me with a clutch of three eggs tells me that "the nest was a large, rather roughly made cup of twigs, fern-stems and moss, both green and dry, lined with fine roots and grasses. The nest was placed at the junction of a large bough with the trunk of the pine-tree about 15 feet from the ground. It was taken at an elevation of about 8,500 feet and contained three fresh eggs, but this was a full clutch, as the bird would not have laid any more."

Skinner also describes a nest obtained by him as very much like that taken by Rattray:—"A typical Green-Finch nest made of a framework of twigs interwoven with brown and green moss, roots, plant-stems, and coarse grass and lined with rather coarse roots. Placed on a large bough of a pine about ten feet from the ground."

The only three eggs in my collection, those given me by Rattray, are a deep bright blue, faintly tinged with green, and spotted sparingly at the larger end with black. The texture is fine and smooth but not glossy. They measure 23.2×16.2 mm., 23.2×16.6 and 23.9×16.3 mm.

Acanthis flavirostris (Linn.).

THE TWITE.

(1085) *Acanthis flavirostris brevirostris* (Moore).

THE EASTERN TWITE.

Acanthis flavirostris brevirostris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 156.

This race of Twite extends to Chitral and Gilgit from the Caucasus and Asia Minor, and again through Persia to Manchuria.

The only record of its breeding within our limits is that of Fulton (Journ. Bomb. Nat. Hist. Soc. vol. xvi, p. 53, 1905), who says that in Chitral this bird is "fairly common on the high grazing grounds at 10,000 to 14,000 feet in July and August. I obtained a nest at 13,000 feet.

"It was built in a worm-wood plant at a height of some six inches off the ground. The nest was well made and was constructed of dried flower-stems of a small yellow-flowered vetch, lined with the seed-down of a stunted willow.

"The eggs were six in number, averaging $.75" \times .5"$, of pale greenish colour, with a few small scattered spots, blotches, and lines of reddish brown, more numerous at the thicker end.

"I left the nest until next morning, when I took the bird, nest, and eggs."

(1087) *Acanthis flavirostris rufostriata* (Walton).

THE TIBETAN TWITE.

Acanthis flavirostris rufostriata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 157.

This Twite is extraordinarily common in Southern Tibet, extending rarely into Sikkim, where it was first obtained breeding by St. J. Hickley and later by Meinertzhagen. It nests at all heights between 12,000 and 16,000 feet, and possibly even higher.

Steen was apparently the first person to obtain the nests and eggs of this bird, sending some of these to Dresser and many to me. Since Steen's time the eggs have been taken yearly by his successors as Trade Agents in Gyantse. A summary of the voluminous notes sent me by various correspondents show that these Twites breed from the middle of May to early August, my earliest and latest eggs being, respectively, the 16th May and 14th August. Possibly some birds have two broods. Most nests are placed in low bushes between a few inches and three feet from the ground, but Kennedy took them in Willows and Birches as high as four and five feet, whilst on the other hand many nests are placed actually on the ground, hidden away among the grass and weeds or tucked into a hollow under some protecting thorn-bush, Juniper or dwarf Birch. Ludlow says that they "breed everywhere, constructing their nest in a low bush, on the ground among sedges or in a hollow in a bank."

The nest is a typical Linnet's nest. Osmaston describes it as a "compact cup-shaped affair of dried grass, lined with wool and hair." Those sent me—and they have been many—have in many cases had the outside much mixed with small twigs, often thorny ones, while in others there has been a mixture of grass, long silvery Birch-leaves, and small roots. The lining has always been of wool, fur or hair of some kind, often two or more mixed, and has invariably been thick and well matted. The outer cup has generally been too much pulled about in transport to measure, but the inner cup has averaged some $2\frac{1}{2}$ inches in diameter by rather less than half that in depth.

Like the nests, the eggs also are typical Linnet's eggs. The ground-colour varies but little, ranging from almost skim-milk blue to a distinct but still very pale blue. In a few eggs there is no blue tint and the ground is a very faint lilac or creamy white. In most eggs the markings consist of freckles, specks and tiny spots of pale reddish, fairly numerous at the larger end but sparse or absent elsewhere. In some eggs the spots are darker, larger and still more scanty and, occasionally, one sees eggs with deep red or brown spots which seem to have run and become surrounded with a paler suffusion of the same colour. A good many eggs have a few streaks and twisted lines on them, while in one clutch in my series all the markings are of this character. As a whole they are feebly-marked eggs and look rather washed out. I have seen only

one egg quite immaculate. The texture is smooth, fairly fine and very fragile, the shape varying greatly. The number of eggs in a clutch is usually four or five, sometimes three or six, and I have one seven.

Two hundred eggs average 18.1×13.3 mm. : maxima 20.2×12.3 and 20.1×14.4 mm. ; minima 17.0×13.0 and 18.2×12.2 mm.

(1087 a) *Acanthis flavirostris ladacensis* Meinertz.

THE LADAK TWITE.

Acanthis flavirostris ladacensis, Fauna B. I., Birds, 2nd ed. vol. viii, p. 655.

Meinertzhagen says that this Twite "is apparently confined to Eastern Ladak," but Osmaston in 1923 (*Ibis*, 1925, pp. 663-719), writing under the name of *A. f. brevirostris*, remarks:—"This species is exceedingly common in Central, Southern and Eastern Ladakh, at elevations of from 13,500 to 16,000 feet. They frequent the same Tama areas as does *Carpodacus rubicilloides*. They are to be seen in flocks early in June, but they soon pair off, and by the end of June they have commenced building.

"The great majority of nests are placed low down in Tama bushes, and a single nest was observed on the ground, but in a few cases nests were found at a considerable height from the ground in Willow-trees. Nests resemble those of the English Red Linnet, and are made of dry grass and are neatly lined with hair."

One nest, it may be noted, was taken from a Willow 11 feet from the ground, so unusual a height that the bird was shot to ensure the identity of the owner.

In his notes to me Osmaston says that in most cases the nests were made of grass only, in some this being mixed with weed-stems. In every instance hair only was used as a lining, generally yaks' hair.

Osmaston took many nests with eggs between the 21st June and 9th July, but Meinertzhagen took one at Tankse on the 21st May.

They probably lay on to the end of August, as Osmaston says that the birds were still building on the 9th July, when he travelled to lower elevations.

The number of eggs laid seems to be four, rarely three or five, while in appearance they cannot be distinguished from those of the other races of Twite.

Fifty eggs average 17.9×13.3 mm. : maxima 20.3×12.9 and 19.1×14.0 mm. ; minima 16.9×12.5 and 18.9×12.2 mm.

(1088) *Metaponia pusilla* (Pall.).

THE GOLD-FRONTED FINCH.

Metaponia pusilla, Fauna B. I., Birds, 2nd ed. vol. iii, p. 158.

This pretty little Finch breeds from the Caucasus through the mountains of Central Asia to Afghanistan, Kashmir, Ladak and

Western Tibet, but it does not occur in Southern Tibet. Fulton obtained it breeding in Birch-forest at 12,000 feet in Chitral. Meinertzhagen found it breeding at Khurdang village, 13,500 feet, but says that it does not ascend above 13,600 feet. Above Quetta it undoubtedly breeds down to 9,000 feet, but in some parts of Kashmir it breeds much lower still, and Rattray obtained a nest with four eggs at Gond at 6,500 feet elevation.

The birds haunt the great Juniper and stunted Birch-covered plateaus of the Himalayas or the hill-sides covered with grass and scrub, seeming to be very partial to Rose-brambles for breeding in. Osmaston remarks (Ibis, 1925, p. 694):—"All the nests found were, without exception, built in wild rose-bushes from three to five feet from the ground" on the dry hill-sides. Many nests are also to be found in Juniper-bushes and trees, Whistler having taken two such nests, built at six feet from the ground on Juniper-trees by the roadside between Kycbang and Jispar in Lahul. The height generally selected for the nest seems to be from two feet upwards, and there are no records of its breeding on the ground, even on banks.

Elsewhere (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, p. 190, 1926) the same writer remarks:—"The Gold-fronted Finch is curiously local in these hills (Dras and Suru Valleys). They breed chiefly at an elevation of 11,000 feet, and where they breed a good many nests may be generally found, but many similar and apparently suitable places will be found unoccupied. They are very partial to wild rose-bushes as nesting sites, but they occasionally build also in dwarf Willows and still more rarely on the face of steep rocks."

The nest is a neat, compact little cup made of fine grasses, fibres and roots, sometimes well plastered over with spiders' webs and excreta, sometimes well matted with vegetable down and wool (Whistler), and always well lined with soft vegetable down or wool, very rarely mixed with a little horsehair. The nests are smaller, stouter and better built than those of the Tibetan Twite, and are of more varied material outwardly. One nest taken by Osmaston at 11,000 feet near Umba (Ladakh) was made of grass only, but even this was matted well together with vegetable down.

They are very late breeders. Rattray took one nest at Gond on the 26th May, but most birds breed in July and many in August, Osmaston obtaining two clutches of five and four fresh eggs on the 10th of that month.

The eggs are similar to those of the Twites, but smaller and often broader in proportion to their length. Unspotted pale blue eggs are not very rare and one clutch of four taken by Osmaston are all of this description. Another clutch taken by Ward in Astore has a pure white ground.

The normal clutch is four, three or five being laid occasionally.

Sixty eggs average 17.3×12.6 mm. : maxima 19.0×13.9 mm. ; minima 15.4×12.2 and 16.3×11.5 mm.

Hypacanthis spinoides.**THE HIMALAYAN GREENFINCH.**(1089) **Hypacanthis spinoides spinoides** (Vigors).**THE HIMALAYAN GREENFINCH.***Hypacanthis spinoides*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 160.

This Greenfinch breeds in the Himalayas between 6,000 and 11,000 feet from the Afghan and Baluchistan boundaries to Sikkim, Bhutan, and Manipur. Magrath says that it probably breeds in the Kurram Valley and that it breeds commonly between 7,000 and 9,000 feet in the Liddar and Sind Valleys of Kashmir. Masson found it breeding in Sikkim between 8,000 and 9,000 feet, though he mistook the birds—the skins of which I later saw—for *Chrysomitris thibetana*.

Dodsworth (Journ. Bomb. Nat. Hist. Soc. vol. xxi, pp. 1075–1080, 1913) gives a very full and interesting account of the nidification of this bird, from which I quote the following:—

“These Finches generally keep to the woody portions of the Hills and are gregarious except in the breeding season. They appear to be partial to certain localities in the stations here and are not to be seen in other parts of it at all. It seems essential for them that the hill-sides shall be fairly well wooded, those covered with Himalayan Cedars (*C. deodara*) and Blue Pines (*P. excelsa*) undoubtedly receiving the preference.

“This Finch breeds in July and August, but the great majority of the birds lay in the last-mentioned month. The earliest and latest dates on which I have taken eggs are the 31st July (3 fresh eggs) and the 14th Sept. (3 fresh eggs) respectively. I may, however, mention that on the 26th July this year I found a nest containing four young ones, about a week old, and the eggs in this case must have been laid about the end of the first week of that month.

“The highest altitude at which I have found these birds nesting is 7,000 ft., but by far the larger number breed at about 6,000 ft. I have never yet taken a nest below the latter elevation.

“These Finches are gregarious even to the extent of breeding in company. I remember once finding no less than half a dozen nests within a radius of not more than 15 yds. I have several times found two nests quite close to each other, and I once took two nests from the same tree.

“They have only one brood annually, so far as Simla is concerned, and build a fresh nest each year. I have never known them to take possession of another bird’s nest, but I once noticed a hen lining her nest with horse-hair taken from an old nest belonging to a Jungle-Crow which was close by.

" Out of a total number of 29 nests I find that the trees selected for building were as follows :—

" Himalayan Cedar (<i>Cedrus deodara</i>)	16 nests.
Blue Pine (<i>Pinus excelsa</i>).....	11 „
Kharki-trees (<i>Celtis australis</i> ?)	2 „

" When a Himalayan Cedar has been chosen the nest is invariably placed on the upper surface of one of the horizontal branches, generally towards the extremity and, in the case of a Blue Pine, in one of the uppermost forks or tufts. In the 'Kharki'-trees the two nests were built on the outer ends of the branches, where they had been pollarded for the village cattle. The nests, no matter what their position is or on what trees they are placed, are without exception well hidden ; in fact so admirably is concealment effected that, if not discovered during the process of construction, it would be almost impossible to find them afterwards.

" The nest takes a week or nine days to complete, and the hen alone, in addition to carrying the materials, is the sole architect. The cock follows her about but gives her no help whatever. The time when the hen is most active in carrying materials is from early in the morning until 10 or 11 A.M. Between 11 A.M. and 3 P.M. occasional trips are made to the nest and then only at long intervals. After 3 P.M. building operations cease for the day.

" The nests are compact, neat, cup-shaped structures, composed chiefly of stalks and roots of grasses and small plants, and other sychlike materials (one only of my nests has a thin coating of moss). It is lined interiorly with very fine grass-roots, thin fibres resembling coir, horse-hairs, and a few feathers and occasionally bits of cotton.

" The heights at which the nests were built varied from 6 to 65 feet, the average of the 29 nests being 30 feet.

" In some cases the birds commenced laying immediately the nests were built, in others a short period elapsed.

" The number of eggs varied from 3 to 5, but the normal complement is 4.

" The eggs are laid one daily, and the hen usually begins to brood after the second egg has been laid.

" The hen alone performs the labour of incubation and while sitting in the nest is fed by the cock. The young are hatched in 13 days and both birds help in feeding them. They leave the nest in about a fortnight."

Hume, who found this bird breeding as low down as 4,000 feet, says that he once took a nest " against the trunk of an aged Deodar, nearly buried in a huge clump of moss, much of which the birds had attached to the sides of the nests," while most of the other nests taken by him had much moss on the outside. Hume gives the dimensions of these nests as about 4.5 inches in diameter, with an internal cup of about 2 to 2.5 inches in diameter and 1.1 to 1.4 inches in depth.

Hume, like Dodsworth, gives the nesting season as July and August, but some eggs taken for me by Masson near Darjiling were found in the first ten days of May.

The eggs in colour are a very pale blue, and I have seen only one clutch in which the ground is almost white, though without any of the pinky tinge found sometimes in Twites' eggs. They are lightly speckled or spotted, generally at the larger end only, with black, occasionally with reddish. I have seen no clutch of eggs all pale, unspotted blue, such as Hodgson describes as normal, but odd eggs of this description are not rare.

In shape the eggs are rather broad ovals, but with well-defined smaller ends. The texture is very fine, smooth, and faintly glossy.

Eighty eggs average 18.7×13.7 mm. : maxima 20.2×14.1 and 19.9×15.0 mm. ; minima 17.2×13.9 and 17.3×13.1 mm.

Dodsworth gives the average weight of 25 eggs as 29.24 gr.

(1090) *Hypacanthis spinoides ambiguus* (Oust.).

THE YUNNAN GREENFINCH.

Hypacanthis spinoides ambiguus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 161.

So far as is known at present this Greenfinch is only found in the Shan States and in Yunnan and Setchuan. In Yunnan Forrest found it at elevations between 9,000 and 12,000 feet in Pine-forests, but Cook, the only ornithologist who has taken its eggs, obtained the nest at Kalaw at about 3,200 feet.

Cook writes (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 267, 1913) :—" I found it fairly common among the Pine-trees, especially so close to the house I was occupying.

" I was very fortunate in finding the nest on the day that I first became acquainted with the bird. I had shot one in the morning and, on returning home, close to the house, I was attracted by a similar bird flying from a Pine-sapling. On investigation I found the nest. It was well concealed, being built into the pines that clustered at the head of the sapling, which was about six feet high. The nest was composed of dry pine-needles, mixed with a little moss, roughly bent into a cup-shape and lined sparingly with wool and feathers, the whole loosely put together, and it came almost to bits on my removing it from its site. The eggs, four in number, and quite fresh, were very pale greenish-blue, sparingly spotted with black, chiefly at the larger end, with one or two hair-like streaks."

The eggs, given to me later by Mr. Cook, were taken on the 7th July, 1912. They measure from 17.9×13.3 to 19.0×14.0 mm.

(1091) *Spinus thibetanus* (Hume).

THE TIBETAN SISKIN.

Chrysomitris thibetana, Fauna B. I., Birds, 2nd ed. vol. iii, p. 162.

Spinus thibetana, ibid. vol. viii, p. 656.

The Tibetan Siskin breeds in Sikkim, Tibet and Ladak, in which latter place Ward and Whympers' collectors obtained a single nest on the 27th July, the parent bird of which was secured and is now in the Museum of the Bombay Natural History Society.

Before this Vidal had received the eggs from Otto Müller, taken in Native Sikkim at about 14,000 feet. One of these eggs and a clutch of three, sold by the Müllers to Dr. H. N. Coltart, are now in my collection, the latter dated 19. 6. 06, the former single egg 22. 6. 86, but I can trace no description of nest or any further details concerning the taking of the eggs.

Both Masson and Macdonald also sent me eggs, said to have been of this bird and to have been taken at nearly 14,000 feet. The nests of these birds were described as having been made almost entirely of grass, mixed with roots and dead moss and lined with a felting of vegetable down. They were placed in Juniper-bushes close to the ground. The birds sent with the eggs were certainly of this species; the eggs are what one would expect this bird to lay and are probably correct.

The eggs are like dull specimens of eggs of the Himalayan Greenfinch, a very pale blue, the larger ends speckled with dull dark red-brown, the specks mostly tiny but mixed with a few larger blotches. In two eggs the markings form dense rings, in the others they are dense at the larger end but form neither ring nor cap. They vary in size from 18.6×13.8 to 19.0×14.1 mm.

Gymnoris xanthocollis.

THE YELLOW-THROATED SPARROW.

(1094) *Gymnoris xanthocollis xanthocollis* (Burton).

THE INDIAN YELLOW-THROATED SPARROW.

Gymnoris xanthocollis xanthocollis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 166.

This Yellow-throated Sparrow is found over the whole of India except in Sind and the North-West Province, where its place is taken by the next race. East it extends into Western Bengal, occurring as far East as Rajmehal, while a bird shot by Sir S. M. Robinson in the Sban States at Kalaw has also been identified as of this species. It occurs in Ceylon and is found throughout

the foot-hills of the Himalayas as far East as Bihar and up to an elevation of some 4,000 feet.

It is a resident bird and breeds wherever found except in the Eastern Punjab, to which Whistler says it is a Summer visitor only, breeding from March to September. Hume says that it does not breed in the extreme South of India, but Bourdillon obtained its nests and eggs in Quilon, and records it as a common breeding bird.

It is almost as familiar a little bird as the Common House-Sparrow and, though normally it makes its nests in holes of trees, it often makes use of holes in walls, hollow bamboos in roofs and eaves, and sometimes, as Betham records, it builds its nest in the lamp-posts in the streets, selecting the hollows under the lights.

When placed in holes in trees they may be built at any height. Hume says :—" Old Mango-trees are often chosen, and in these the nests may be found 30 feet from the ground, though usually they are at heights of 12 to 20 feet ; sometimes some old stub is patronized, and then the nest may not be a couple of feet from the ground. On one occasion I found a nest in a hole in a stem of an old heens bush (*Capparis aphylla*), which stem was barely 5 inches in diameter."

Jesse found a nest built yearly in an empty jar lying on its side on a roof in Lahore City, where he took many nests. Nests may often be found close to one another, and Bingham "found more than a dozen nests in one immense peepul-tree." Jerdon says "it breeds in trees, and in some parts of the country in roofs of houses, in the hollow bamboos of the roof, and occasionally in pots hung out for this purpose." The nest, in whatever kind of hole it may be placed, is always the same, a small mass of rubbish, in which grass forms a large or major portion, with a dense lining of feathers, large and small. Sometimes grass forms practically the whole of the nest, while at other times this is mixed with roots, leaves, rags, bits of string, snake-skins or any other oddments which may lie about in the vicinity of the nesting site. Usually the nest externally is shapeless, but Hume records that "sometimes a more or less cup-shaped nest is formed, fine strips of bark and tow being added to the grass ; and, again, at times it is a regular pad of hair, tow, and wool, with a few feathers, all closely interwoven, and with only a little central hollow."

Over the whole of its range April seems to be the principal breeding month, a good many birds also laying in May, more especially in the early part of that month. In Lahore Dodsworth found them breeding in May and June, and Bingham says that in Delhi they also breed in the latter month, while in Allahabad they commence to lay in March. All my other correspondents from South, North, East and West give April as the month in which most eggs are laid.

The full clutch consists of three or four eggs only, but Davidson found that in the Satpuras two eggs formed the normal clutch.

The eggs are quite typical Sparrows' eggs; the ground is white, generally tinted with brown or yellowish-brown, less often with pale greenish. Most eggs have this almost obliterated with smudges, smears, streaks and blotches, varying in colour from grey-brown or tan-brown to deep sooty black. I have clutches which look as if they had been dipped in soot, hardly a glimpse of any ground being visible. At the other extreme I have a clutch with a pale greenish ground boldly and thickly blotched with black at the larger end and less thickly elsewhere.

The texture is normally dull and glossless, but I have one clutch taken by Whistler in which two eggs are very glossy and two slightly so. In shape they are broad, short ovals, seldom much compressed at the smaller end.

One hundred eggs average 19.0×13.9 mm.: maxima 21.1×14.2 and 20.0×15.0 mm.; minima 16.0×12.9 mm.

According to Gill (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 763, 1923) both birds take part in the construction of the nest, but the female alone seems to carry on incubation, the male sitting in close attendance and constantly uttering a monotonous chirrup which calls attention to the nest.

(1095) *Gymnoris xanthocollis transfuga* Hartert.

THE SIND YELLOW-THROATED SPARROW.

Gymnoris xanthocollis transfuga, Fauna B. I., Birds, 2nd ed. vol. iii, p. 168.

Within our limits this Sparrow breeds in Sind and the extreme West of the Punjab and the North-West Province, whence it extends into Baluchistan, Afghanistan and Persia.

The nesting of the present race differs in no way from that of the preceding bird, though it seems to build its nest more frequently in walls and roofs of buildings, possibly owing to there not being sufficient trees for building purposes. Like the last bird, it often appropriates the nesting-holes of Barbets and Woodpeckers and, again like the last bird, it has the curious habit of placing its nest in lamp-posts.

Butler writes (Hume's 'Nests and Eggs,' vol. ii, p. 158) from Hyderabad in Sind:—"15th April, 1878. A nest built in a hole of one of the mud walls of my verandah, about 12 feet from the ground, containing four much incubated eggs. Another nest on the 1st May, near the same spot and in a similar position, contained three hard-set eggs, and another on the same date inside the top of an old lamp-post.

"The hole by which the bird entered was in the bulb at the top of the post upon which the lamp rests and was so small that the hen bird had some difficulty in passing in and out. I may add that the lamp was lit regularly every evening and burnt all night.

Subsequently I found several other lamp-posts in camp occupied by a pair of these Sparrows."

Eates informs me that he has found them partial to small natural hollows in "*lai*" and "*babur*" trees, and he notes that the grass-and-feather-lined nests are often very meagre and poorly put together. Otherwise the nest is much like that of the Indian race and is built of similar materials.

Occasionally, owing to no holes in trees or elsewhere being available, they breed in queer places. Ticehurst thinks a pair he found breeding in an isolated "*Babool*" grove nested in an old Crow's nest, whilst Whitehead found a pair that had built a nest like "that of *Passer domesticus* and placed conspicuously in the top of a thorn-bush." This was found at Kohat on the 1st April, and this month seems to be the usual breeding one, a few eggs only being laid in May.

The full clutch numbers three or four, and the eggs cannot be distinguished from those of the Indian race.

Twenty-six eggs average 18.0×12.6 mm. : maxima 19.4×13.1 and 18.0×13.3 mm. ; minima 17.4×12.8 and 17.7×12.3 mm.

Passer domesticus (Linn.).

THE HOUSE-SPARROW.

(1096) *Passer domesticus indicus* Jard. & Selby.

THE INDIAN HOUSE-SPARROW.

Passer domesticus indicus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 170.

In the 'Fauna' I gave the distribution of this Sparrow at length as follows :—"Kathiawar, Sind, Baluchistan, Punjab and North-West Frontier Province to Gilgit ; Rajputana, the United Provinces, Northern Central India into Bihar and Chota Nagpur." This Sparrow ascends the Himalayas to a considerable elevation and is common in many hill-stations to which it has followed mankind.

The nesting habits of all the House-Sparrows are very similar and a description of these of one suffices for all. In Hume's 'Nests and Eggs' no differentiation of races is made, and one would like to quote *in extenso* Hume's and Aitken's remarks, but space forbids.

Normally all House-Sparrows build in holes, crevices and crannies, but it is a matter of indifference where the hole is, though if another bird wants it this adds to their own desire for it, and they like nothing better than to drive their weaker brethren out of their homes. In India, as in Europe, they often turn various Swallows.

out of their nests, and I have seen them turn Swifts out of theirs. Where they meet the Tree-Sparrow or the Cinnamon Sparrows, these invariably have to give up their homes although there may be similar empty holes just alongside. So also if the site selected for their nest is some place where they are a horrible nuisance a great joy is added to their domestic work. They seem always to prefer an uncomfortable site in a verandah, which they can render uninhabitable for humans by their litter, to a comfortable site outside, while an almost impossible site in drawing-room or dining-room is only given up after a fight carried on with a perseverance worthy of something better.

The nest is composed of rubbish of all kinds, leaves, grass, roots etc., lined thickly with feathers, sometimes soft but frequently mixed with the stiff quill-feathers of fowls, which certainly do not give one the impression of comfort. The nests may be placed in holes in trees, walls, thatch, wells or other places, but often very curious sites are selected. Aitken records a nest built between a pair of deer's antlers in a drawing-room, and until it was completed Aitken remarks that the room was perpetually like a stable. How the Sparrows must have enjoyed this! Nests have been found in empty water-jars, on verandah posts, on the joists of beams and laths under the roofs of houses etc., while Aitken adds street-lamps in Bombay as another favourite resort. He says:—"The hollow is commodious enough, and the neck or mouth is narrow, so the place is admirably adapted for the Sparrow's purpose, but must be like a furnace during the heat of the day. Besides, a man goes up twice every day to clean and attend to the lamp, and remains for a minute or two bustling and fumbling about within 4 inches of the nest. Then again the gas is blazing all night with a glare that would astonish any bird more susceptible than *Passer domesticus*."

Occasionally the House-Sparrow makes a large ball-shaped nest which he places in the dense foliage of a tree or bush. In these rare instances the same materials are used as for the ordinary nests, but in much greater quantity.

The breeding season in the hills coincides with that of most birds, i. e., April, May and June, but elsewhere, though March and April are the principal breeding months in most places, nests with fresh or hard-set eggs or young may be found in almost every month of the year.

The clutch varies in Sind from three to four and elsewhere from four to six, though Dodsworth once took eight eggs in a nest in Simla.

The eggs are like all other House-Sparrows' eggs. The ground varies from pure white, which is most usual, to a pale grey or grey-brown, or still more rarely grey-green. The markings consist of mottlings, blotches or freckles of blackish, with secondary similar

marks of neutral tint and grey, seldom at all conspicuous. In most eggs the markings are numerous everywhere, while in a few they are definitely more dense at the larger end. Occasionally the blotches are less numerous and bolder, standing out well against the ground. In most clutches one egg is conspicuously more boldly and scantily marked than the others. In this particular race grey-brown or grey-green specimens appear to be quite exceptional.

One hundred and twenty eggs average 20.6×14.9 mm. : maxima 22.4×14.3 and 19.5×16.4 mm. ; minima 16.6×14.4 and 18.5×13.9 mm.

(1097) *Passer domesticus nigricollis* (Burton).

THE BURMESE HOUSE-SPARROW*.

Passer domesticus confucius, Fauna B. I., Birds, 2nd ed. vol. iii, p. 172.

Passer domesticus nigricollis, ibid. vol. viii, p. 656.

This House-Sparrow has a very wide range, being found in Ceylon, the whole of India South and East of the preceding race. They occur over the whole of Burma as far East as Karenni and as far South as Moulmein. Birds from Nepal and Sikkim are intermediate between the present race and *parkini*, but may more conveniently be placed with the Indian bird.

There is little one can write about the nidification of this race which is not applicable to all. Where thatch roofs are available they undoubtedly prefer nesting in these to any other place. They are just as bold, bullying and impertinent as are all other Sparrows and, wherever they follow mankind into the hill-stations, they steadily push out the Tree-Sparrow and Cinnamon Sparrow. In Eastern Assam the Tree-Sparrow was the common bird in all stations, building in the thatch of every house ; now the land knows him no more. So, also, when I first went to Shillong, the Cinnamon Sparrow was common in all gardens, breeding in the thatch roofs of the hungalows, but now they have almost entirely gone away, driven out by the House-Sparrow.

The principal breeding season is April to July, though nests with eggs may be found in almost any month of the year. In Burma March and April are probably the two favourite months.

The eggs, four to six in number, are like those of the preceding birds, the brown-tinted ones being rather more numerous.

One hundred and forty eggs average 20.7×14.8 mm. : maxima 23.1×15.6 mm. ; minima 17.3×14.4 and 18.2×13.7 mm.

* Though Burton described this race from Fort Pitt, Chatham, in South India, it seems better to give this as the trivial name, for the bird is found over a greater area than the term "Southern Indian" would infer.

(1098) *Passer domesticus parkini* Whistler.

THE KASHMIR HOUSE-SPARROW.

Passer domesticus parkini, Fauna B. I., Birds, 2nd ed. vol. iii, p. 173.

The Kashmir House-Sparrow breeds in Kashmir, Ladak and Western Tibet up to 14,000 feet. It is possible that when the full range of this Sparrow has been worked out we shall have to extend its breeding area considerably.

Like all House-Sparrows, where found it is extremely common, and its nesting arrangements are similar to those of all others. As a hill-bird it has a more restricted breeding season than its tropical cousins but it does its utmost in the time available. In the lower hills it commences to breed in the end of April, and Ward has taken fresh eggs as late as the 15th September, so between these dates about three broods can be successfully reared. At higher levels the birds do not breed until the end of May, but even then two broods are often hatched.

The clutches of eggs are larger than those laid by more Southern birds, and though four eggs only are sometimes laid, five and six are normal and seven not infrequent.

Eighty eggs average 21.4×15.2 mm. : maxima 23.2×15.5 and 20.4×15.7 mm. ; minima 20.0×14.6 and 22.0×14.5 mm.

(1099) *Passer pyrrhonotus* Blyth.

THE SIND JUNGLE-SPARROW.

Passer pyrrhonotus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 174.

This little Sparrow's breeding range is confined to Sind and the Punjab. Rattray found a colony breeding close to Nowshera, where he took nests and eggs.

Doig was apparently the first to take the nests and eggs of this bird and, a little later, Harrington Bulkly also found them breeding very commonly in many places in Sind. Eates, Ticehurst and Bell also found it common in many parts of Sind, but it seems to be restricted to the vicinity of rivers, canals and swamps, its nest never being found at any distance from water, while it is often built on bushes and trees standing in it. In the Punjab, again, it appears to build always near water. A. E. Jones writes (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 566, 1916):—"In Lahore it breeds usually in colonies in Kakur-trees close to water. I have found nests in May, June and August and at Wazirabad in April in the above situation, the only exceptions to which were two nests, one built in a creeper forming an ornamental arch in a garden and the other in a bole in an iron gate at a level crossing which had, the year before, been tenanted by a pair of Yellow-throated

Sparrows, but in both cases the nests were in the vicinity of water. Other places where I have met with this bird are Dera Ismail Khan, Multan, Gurdaspur and Ferozepore, so it would appear to be pretty generally distributed over the Punjab. It would appear to be a resident at Lahore."

In 1911 (*ibid.* vol. xxi, p. 1073) Jones had already recorded this bird's breeding in an old nest of a Baya-bird at Lahore.

Although Jones found them breeding as above shown at Lahore, normally this Sparrow is not a bird of villages, towns or human habitations, and is shy and retiring in its habits. With the exception of the nest recorded by Jones I have never heard of this Sparrow building in holes of any kind. It practically invariably makes a very large nest, shaped like a rugger football with an entrance on one side. This is built on trees and bushes close to or actually standing in water. Doig found these nests on Acacias, Ticehurst and Bell found them breeding in dense mixed Tamarisk and Acacia, while Eates obtained nests "both on Acacia and Tamarisk up to 8 and 10 feet from the ground and again on bushes of the same within 2 or 3 feet of the water."

The nest is composed of grass and Tamarisk-twigs, sometimes one of these only, sometimes of the two, and it is well lined with feathers. Sometimes with the grass and twigs a certain number of coarse roots may be mixed and, whatever the materials of which the nest may be composed, they are very roughly put together and the whole structure is very untidy, but not flimsy or weak.

The breeding season varies considerably in the same area, perhaps depending on rainfall. Thus Bell found young ready to fly in April, and Ticehurst found them about to breed on the Manchar Lake on the 10th March. The general breeding season is April and May, while a second brood is often reared in July and August. Eggs have, however, been taken in every month from March to August, and Eates found a big colony busy laying in mid-September.

The eggs number three or four, two only being sometimes incubated. They are typical little House-Sparrows' eggs, and go through all the same variations as those of that bird. In addition I have seen some clutches with a very yellowish ground, profusely speckled with brownish, but with the ground the dominant colour. In nearly every clutch there is one egg, often two, much paler and less blotched than the others, while clutches of eggs with a white ground boldly blotched with dusky brown or inky grey are numerous. I have seen no sooty-looking eggs, such as are very common among the eggs of the Yellow-throated Sparrow.

One hundred eggs average 17.8×13.1 mm. : maxima 20.8×13.2 and 18.2×14.0 mm. ; minima 15.8×12.0 mm.

Both birds take part in the construction of the nest but the female alone incubates.

Passer montanus (Linn.).

THE TREE-SPARROW.

(1102) **Passer montanus malaccensis** Dubois.

THE MALAY TREE-SPARROW.

Passer montanus malaccensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 177.

This, the most widespread race of Indian Tree-Sparrows, has a breeding range throughout the lower hills of the Himalayas from Kuman and Kashmir to Eastern Assam and the hills of Northern Burma. Thence it extends throughout Burma and the Malay Peninsula to Java, Sumatra and Borneo. It is common in Yunnan, Siam and South-West China; while Delacour obtained it practically throughout French Indo-China.

This little Sparrow is found up to 7,200 feet near Darjiling and to about 8,000 feet in Kashmir. Their breeding habits are very similar normally to those of the House-Sparrow and they prefer above all other breeding sites the thatched roofs of human habitations. When, however, its objectionable cousin, the common House-Sparrow, appears it at once usurps their homes, and not infrequently steals the wives also, as happened to my own knowledge on several occasions in Assam. In the roofs of houses it scratches out burrows for itself or it builds a nest on laths under the eaves. Pushed out of human habitations it will place its nest in holes in walls and trees or in the nesting holes of Bee-eaters, Kingfishers and Sand-Martins. The nests I have seen *in situ*, a very great number, have all been in holes of some sort or else tucked away in corners between or over laths and beams of houses but, apparently, they sometimes build in trees, for Hume states:—"The nest is a huge warm cup, at least huge for the size of the eggs, exteriorly 6 inches by 4.5, and nearly 2 inches in height, with a cavity 3 inches by 3.5 by 1.5 in depth. Interiorly it is very closely and smoothly and softly lined with feathers. Round this is a quantity of tow or similar soft vegetable fibre, while exteriorly the nest is composed of more or less coarse grass-blades and stems."

The nests I have seen have varied greatly. Some built in holes in thatch consisted of nothing but a mass of soft feathers fitting into the end of the hole as a lining for the eggs to lie on. Others were as described by Hume and must have contained several handfuls of materials, whilst others again have been intermediate in size. Two or three nests I have taken from holes in trees consisted of about a dozen small feathers and nothing more. Many which I have examined in the burrows of Sand-Martins are just the old Sand-Martins' nests, sometimes relined with a number of soft feathers.

A nest taken by Rattray at Nagtiba in the Murree Hills is the furthest West record I have, though Whympers obtained nests

and eggs at Naini Tal. It is also the highest elevation, about 9,000 feet. This appears to be the only time Ratray obtained it breeding, the nest being in a hole in a tree.

In Burma, where Oates, Mackenzie and many other collectors have taken eggs, from the Northern hills to South Tenasserim, all the nests have been built in holes in thatched roofs.

In Northern India the Tree-Sparrow breeds from May, rarely April, to August, and certainly has two, or sometimes three, broods in that time. In Burma and Siam I have eggs in my series taken from January to August and, doubtless, if trouble had been taken to hunt for them, eggs might have been obtained in almost any month of the year.

In Northern India a full clutch of eggs numbers four to six, but in Burma and Siam only three or four eggs are laid and very exceptionally five. They are typical little House-Sparrow eggs and go through all the same variations. Sir F. Williamson in Siam obtained several clutches almost plum-coloured, the ground being a pale purple grey almost obliterated by tiny freckles of blackish and lavender-grey. Even these clutches, however, have each one egg with a white ground handsomely blotched with sooty brown and pale inky grey. A curious clutch taken by Mackenzie in Prome has the ground terra-cotta pink, this being almost covered with tiny specks of brick-red which coalesce at the larger end to form small reddish-black caps. In this clutch the usual differing egg has a cream ground lightly smudged and blotched with pale reddish.

One hundred and forty eggs average 19.2×14.2 mm. : maxima 21.8×15.0 and 19.2×15.2 mm. ; minima 17.0×13.5 and 18.6×13.1 mm.

I do not know if both parents incubate, but both have been caught in the nesting holes, sometimes both together, sometimes singly. Both take an equal share in bringing materials and, probably, in building the nest. Incubation takes thirteen days, occasionally, perhaps, only twelve days, though it is generally rather hard to tell exactly how long a bird is sitting in a hole, often of considerable depth. They are bold little birds and stand a great deal of interference before they will desert the nest, so that, if one chances on the first or second egg of a clutch when first laid one can visit the nest daily and inspect it until the last is laid.

(1103) *Passer montanus dilutus* Richmond.

THE AFGHAN TREE-SPARROW.

Passer montanus dilutus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 178.

The Afghan Tree-Sparrow breeds from Turkestan to Afghanistan, Yarkand and Gilgit. No record of its breeding within our limits exists except on the Afghan Frontier. This breeding is summarized

by Whitehead as follows:—"Common in winter in the Miranzai Valley, a few individuals occurring as low as Kohat and Banda. Mr. Donald found a nest with young in Doaba Station (3,000 ft.) in May and says that the bird nests regularly at Shinauri (3,800 ft.). It possibly also does so at Thull (2,550 ft.), where I observed a solitary example on the 18th May. In the Upper Kurram this species and *P. domesticus* are present in about equal numbers in Summer, and build alongside one another in houses; but the former, as noted by Capt. Fulton in his paper on 'The Birds of Chitral' gets the pick of the nesting sites before the latter's arrival, and in many cases *P. domesticus* has to put up with holes in cliffs."

The enormous number of these birds in the Kurram Valley is referred to by Rattray (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 340, 1899):—"During March these birds passed through Thull in thousands, and all from these parts appear to go to the Upper Kurram Valley to breed. I found 20 and 30 nests in every house and verandah in Parachinar in July."

In Quetta also it is very common. Meinertzhagen remarks (Ibis, 1920, p. 141):—"An abundant resident. Three obtained in January, May and December agree well with Turkestan specimens."

"Fresh eggs were found from 2. iv. to 4. vi., and all nests were in or near human habitations. This species does not ascend above 7,500 feet."

The breeding season on our frontier lasts from April to August, and many birds have two or more broods.

Ludlow found this Sparrow breeding freely at Koh Terek in May and sent me a fine series of their eggs. These show all the variations of other Tree-Sparrow eggs and number five or six in a clutch, whilst the birds on the Indian frontier seem to lay four or five.

Taking them as a whole they are dull eggs and longer in proportion to their breadth than most Tree-Sparrow eggs.

Forty eggs average 19.8×14.1 mm.: maxima 23.0×14.2 and 20.2×15.0 mm.; minima 18.2×13.4 mm.

(1104) *Passer montanus tibetanus* Stuart Baker.

THE TIBETAN TREE-SPARROW.

Passer montanus obscuratus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 179.

Passer montanus tibetanus, ibid. vol. viii, p. 656.

In the 'Fauna' I suppressed my *tibetanus*, but Meinertzhagen later showed that the Szechuan bird, *obscuratus*, was larger and that *tibetanus* must be retained. The range, therefore, of our bird will be restricted to South Tibet and Sikkim.

I have no record of this Sparrow breeding within Indian limits, but it will certainly be found to do so in Sikkim at great elevations.

In Tibet it breeds in numbers between 12,000 and 15,000 feet, whilst in Sikkim St. J. Hickley found it in Summer between 10,000 and 12,000 feet. This bird is extremely common in and all around Gyantse. Ludlow (Ibis, 1928, p. 65) writes:—"A resident. Common everywhere from Yatung to Gyantse. In winter they keep to the neighbourhood of houses, but in summer many wander further afield, and often breed at a considerable distance from human habitations. In early autumn they occur in large flocks in the barley-fields, where they do much damage. The breeding season is an extensive one—from April to July. The nest is an untidy structure of grass, wool, feathers, bits of rag and other odds and ends. Sometimes it is placed under the eaves of a house, and sometimes in holes in banks and walls. Clutches vary from three to five."

A great number of their eggs have been sent me from time to time by various correspondents from Gyantse, and I have records of nests taken in walls and under the eaves of houses, in retaining and boundary walls and banks, and also from holes in trees, though this last seems unusual.

I have eggs taken from the 23rd May to the 7th August, but have been informed that many birds breed in April. The eggs are typical Tree-Sparrows*, but as a series are very brown, some clutches quite richly so.

Fifty eggs average 20.8×15.1 mm.: maxima 22.0×15.3 and 21.0×15.9 mm.; minima 19.5×13.9 mm.

Passer rutilans *.

THE CINNAMON SPARROW.

(1105) *Passer rutilans cinnamomeus* Gould.

THE BHUTAN CINNAMON SPARROW.

Passer rutilans cinnamomeus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 180.

For the present I retain the three races of this Sparrow as divided in the 'Fauna,' though I find the small, dark bird from Sylhet, Cachar and Manipur difficult to absorb in any of them. Rothschild's *intensior* from Yunnan is still darker and richer in colour and much bigger, so that these birds, as well as those from Western Burma, cannot be relegated to that race. It may be that with material

* Ticehurst has an interesting note on this Sparrow (Journ. Bomb. Nat. Hist. Soc. vol. xxxii, p. 347, 1927), but the question is more complicated than he thinks. Even in 1881, when I first went to India, there was a regular trade in bird-skins in the Darjiling bazaar, the skins coming across from Native Sikkim, S. Tibet and Bhutan, and I have no doubt that Gould and many others obtained some of their skins in this way.

available the species should be still further split up. Until that is done I maintain the breeding range of this bird as "Eastern Himalayas, Nepal, Tibet, Bhutan and Eastern Assam, North and South of the Brahmapootra; Manipur and Northern Burma West of the Irrawaddy."

Over most of its range the Cinnamon Sparrow is resident, but in Summer many birds move to very great elevations for breeding purposes. Ludlow (Ibis, 1928, p. 66) says that it arrives at Gyantse early in April and leaves in October. "It breeds in May and June in holes in banks, old mud 'chortens,' between the stones in bridges and in similar situations. Nests are made of grass and straw and are lined with feathers and hair. One nest I found was lined with the highly aromatic green leaves of a species of *Artemisia*."

There are no records of the breeding of this form in Hume's 'Nests and Eggs,' but I found it fairly common in North Cachar and very common in the Khasia Hills. In North Cachar it is purely a jungle-bird, nesting always in holes in trees or dead stumps, sometimes making use of small natural hollows, at other times occupying the deserted nesting holes of Barbets and Woodpeckers. They seemed to have no preference for low or high situations for, though I have never seen a nest below about 6 feet from the ground, many other nests were over 20 feet and some over 60 feet up in large trees. Nor do the birds seem very particular as to what kind of country the trees stand in. I have found nests in stumps in ravines, in scrub-jungle, in lofty trees in high dense forest and, perhaps more often than anywhere else, in dead trees standing in cultivation patches surrounded by jungle of some kind. The nest is similar to that of the Tree-Sparrow, a mass of oddments of all kinds, thickly lined with feathers. I have seen nests composed of many handfuls of dead leaves, grass, small twigs, roots, moss and lichen; others of half this bulk and mostly grass and roots, while, in a few cases, I have found merely a little grass or a few bamboo leaves, just enough to form a basis for the feather lining, which never varies.

In the Khasia Hills, when I first knew this District in 1886, the Cinnamon Sparrow was the common form of Sparrow and the House-Sparrow a rarity; the former was then a builder in the thatch roofs of the houses of Shillong and all villages, only quite exceptionally breeding in holes in trees close to gardens. In 1900 the House-Sparrow was everywhere numerous, and though the Cinnamon Sparrow still bred in buildings it was almost as often found nesting in holes in trees. Finally in 1917 my Shillong correspondents told me that it no longer bred at all in that town and had become almost a rare bird elsewhere, though I understand it is still to be found quite commonly in remote villages.

When nesting in roofs it bores a hole in the thatch, often to a depth of three or even four feet, and then makes in it a nest similar to that made in holes in trees but, usually, not so bulky.

The breeding season is from early April to August, and most birds have two broods, but very seldom three.

The eggs in a full clutch number four to six and cannot be distinguished individually from those of Tree-Sparrows. Examined as a series they are, perhaps, more richly coloured and have a slight gloss. In shape also they are rather more obtuse ovals and so appear to be broader. I have several clutches of which the eggs are all, or with one exception, coloured brown, of a rather rich tint, which looks unicoloured unless carefully examined, when the eggs are seen to have a buff ground almost obliterated with fine freckling of red-brown. The variation among eggs of the same clutch is not so great as in those of other Sparrows, though one egg is often in great contrast to the rest.

One hundred eggs average 19.2×14.2 mm. : maxima 21.1×14.1 and 19.0×14.8 mm. ; minima 17.0×13.0 mm.

Both birds assist in building the nest, the female directing work and seeing that the male does as he is told. Both birds also incubate and very often remain in the nest-hole together. Incubation takes 12 (rarely) to 13 days. Sometimes while the hen is sitting the male perches on the roof just above the nest and sings—at least it is to be presumed he thinks he does—uttering a constant sweet little twittering note which he keeps on for some minutes at a time.

(1106) *Passer rutilans debilis* Hartert.

THE KASHMIR CINNAMON SPARROW.

Passer rutilans debilis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 181.

This race of Cinnamon Sparrow replaces the last over the whole of the lower North-West Himalayas from the foot-hills up to about 9,000 feet, but most commonly between 3,000 and 6,000 feet, though Osmaston found it extremely common at Aru in the Liddar Valley at about 8,300 feet.

The nesting of this species differs in no way from that of the last and, like that bird, it sometimes haunts forest and breeds in holes in trees and, at other times, human habitations and in the eaves of the roof and in holes in walls. Marshall (G. F. L.) says that at Naini Tal "it breeds most commonly in the eaves of verandahs and outhouses." At the same place, however, Whymper took many nests from holes in trees. In Murree both Rattray and Marshall (C. N. T.) say that it builds about houses and often in deserted Swallows' nests, but the former also found it placing its nests in holes in trees.

Cock, writing of Dharmasala, says:—"It usually breeds about 4,000 to 5,000 feet. It always breeds in hollow trees, especially in the rhododendron, and makes a large nest of grass lined with feathers after the usual Sparrow fashion."

At Kotegarh Hume tells us that the bird is so common that "a hundred nests may be found within a radius of a quarter of a mile, but they do not cluster together in Sparrow-towns as the Willow-Sparrows do."

The breeding season is from April to July, many birds having two broods and, in some cases, three, such broods taking them well into August.

The normal clutch of eggs is four or five, generally the former, but Hume took one of six, while I have known three to be incubated.

They cannot be distinguished individually from those of *cinna-momeus* but, as a series, are more blotched and less stippled, more grey and less brown.

Sixty eggs average 18.9×13.9 mm. : maxima 20.2×14.1 and 19.1×14.6 mm. ; minima 18.0×13.1 mm.

(1108) *Passer flaveolus* Blyth.

THE YELLOW-BELLIED SPARROW*.

Passer flaveolus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 182.

This Sparrow is resident all over Burma from Arrakan on the West and from the Shan States on the East as far South as Prome in Tenasserim. East it occurs throughout Siam, Annam and Cochin China.

Oates found this bird breeding very commonly in Pegu both in houses and in holes in trees. In Siam Herbert and Williamson obtained series of eggs from holes in trees "nearly all in trees standing in rice cultivation," but the latter also had the bird breeding in his garden both in holes in trees and in the thatch of outhouses. Harington, Wickham, Mackenzie, Cook and Hopwood, who all saw many nests of the Yellow-bellied Sparrow, found it more of a Tree-Sparrow than a House-Sparrow, though they took a certain number of nests from thatched roofs of bungalows and also one or two from niches on rafters under the thatch.

The nests are described as just like those of the Tree-Sparrow, a miscellaneous assortment of grass, leaves, roots and other oddments, always well lined with feathers. Sometimes the nests were very hulky, sometimes rather scanty, but the lining never varied.

April is undoubtedly the month in which most eggs are laid, but I have others given to me by various collectors, taken in each month from February to July, while probably eggs are laid occasionally in any month of the year.

* Although this bird has long been known as the "Pegu House-Sparrow," this name may confuse, as there are other House-Sparrows in Pegu, whilst the bright yellow belly at once separates this Sparrow from others.

The eggs number three or four, sometimes two only, and are in appearance like other Tree-Sparrow eggs. In one clutch of four taken by Mackenzie in Maymyio there is one pure white egg, one almost black, the dense stippling covering the whole ground, while the two remaining eggs are mottled grey.

Eighty eggs average 18.6×13.9 mm. : maxima 21.0×14.2 and 19.2×15.2 mm. ; minima 16.1×13.8 and 17.0×12.9 mm.

As is usual with all Tree-Sparrows, both parents often stay in the nest together and when the young are hatched the whole family sleep in it. The male has a little twittering chirp which he sings to his wife when she is sitting, often giving away the site of the nest by so doing.

Montifringilla nivalis (Linn.).

THE SNOW-FINCH.

(1111) Montifringilla nivalis adamsi Adams.

THE TIBET SNOW-FINCH.

Montifringilla nivalis adamsi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 187.

This Snow-Finch is found breeding in Kashmir, Ladak and Tibet at elevations over 12,000 feet. It ascends to at least 16,000 feet, as Stoliczka records it at this height at Rupshu, while Wollaston says (Ibis, 1922, p. 518) :—"Generally distributed between 14,000 and 16,000 ft. Nests with young were found in July in old walls and piles of stones."

Adams says it is "common on the bare and barren mountains of Ladakh and Little Tibet, and feeding on the seeds of the few plants found in these dreary and desolate-looking mountains. The nest is composed of grass, and generally placed in the long dykes, built by the Tartars over their dead."

Ward obtained nest and eggs in 1906 at Kot-la, near Ladak, while Col. F. M. Baily, Kennedy and others have taken other nests in South and Western Tibet. Baily in sending me a clutch of eggs writes :—"Very common at Phari-between 14,000 and 14,500 feet, breeding in the burrows of the Mouse-hare. The nest is a very rough affair of grass and of no particular shape, but there was always a lining of fur, this also generally that of the Mouse-hare. They breed from May to July."

Ludlow and many of my other correspondents found it very common on the Gyantse plain, where also they breed principally in the burrows of the Mouse-hare. They, however, found nests very difficult to locate, and Capt. F. Kennedy, who sent me a clutch of eggs, said he only found it when, stepping almost on the hole, the bird flew out.

Osmaston took several nests in Ladak and gives the following interesting account of the nidification (Ibis, 1925, p. 696):—"This Finch is fairly common throughout Ladakh from about 12,500 feet up to the snow-line. They frequent rocky slopes, but are often to be seen feeding on moist ground in the vicinity of streams.

"The song of the cock-bird is poor and very monotonous. They have a curious and characteristic habit of flying very slowly, a sort of hovering flight with the wings raised above the back and with the tail extended, displaying the white of the wings and tail, which is largely concealed when the birds are at rest.

"They are very tame and fearless of man. Breeding commences early, about the middle of May. Nests are placed deep in a crevice in the rock or more frequently under a fair-sized rock. Also occasionally in a *mané* wall. The birds sit close and do not readily leave the nest, which is best located by watching the birds building or returning to the nest after feeding early in the morning.

"The nest is often very difficult to reach, as it is frequently two or three feet from the surface, and a crowbar or other tool may be necessary.

"Nests are composed of a mass of fine yellow grass (the flowering stems), lined copiously with hair (of the yak, marmot etc.) and with feathers."

Osmaston found nests begun as early as the 19th May and took eggs from the 28th May to 13th July. I have one clutch from Gyantse which was taken on the 7th July.

The number of eggs laid seems to be normally four, rarely three only.

They are pure white, the texture hard and close, with a fair gloss. In shape they are generally broad ovals rather pointed at the smaller end.

Thirty eggs, including all Osmaston's, average 23.0×16.5 mm.: maxima 25.5×16.9 and 24.8×17.0 mm.; minima 21.6×16.0 mm.

Osmaston gives the minimum length as 20.7 mm., and the maximum breadth as 17.8 mm.

(1112) *Montifringilla taczanowskii* (Prjev.).

THE ASHY-NECKED SNOW-FINCH.

Montifringilla taczanowskii, Fauna B. I., Birds, 2nd ed. vol. iii, p. 188.

This species is found from Sikkim and Tibet to Kansu, and probably breeds above 12,000 feet in all these countries:

There is very little on record about its nidification. I have one clutch of four eggs taken by Capt. Steen near Gyantse, sent me with the following note:—"Nest a pad of fine dried grasses and a few chips of leaves, placed in a chamber at the end of a rat's burrow, and lined with fur. Site selected, a very barren, stony waste on a gradually sloping hill-side."

This nest was taken on the 19th June, 1906, and later Steen wrote me that the burrow was probably that of a *Lagomys* and not a rat.

Lndlow (*Ibis*, 1928, p. 67) says that this Finch is very common around Phari, "living with mouse-hares in whose burrows it breeds. Capt. Steen took its eggs on a hill near Gyantse, but it is not common there. I have seen fully fledged young at Kala early in July."

The eggs are indistinguishable from those of the preceding bird, the four measuring 23.1×16.9 , 23.8×17.1 , 24.1×18.0 and 21.6×16.4 mm.

(1113) *Montifringilla ruficollis* Blanford.

THE RED-NECKED SNOW-FINCH.

Montifringilla ruficollis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 189.

The Red-necked Snow-Finch occurs and probably breeds in Sikkim, Tibet to Koku Nur and Kansu between 12,500 and 15,000 feet.

The first account of this bird's nesting is that of Baily (*Journ. Bomh. Nat. Hist. Soc.* vol. xx, p. 221, 1910), who writes:—"This bird nests in the disused hole of a mouse-hare (*Lagomys*). I have only obtained one nest, which was about one foot below the surface of the ground at the end of a tunnel about 4 feet long from the entrance. The nest was very roughly made of roots and grass and was lined with feathers, wool and the fur of the mouse-hare. The nest contained four white eggs.

"These eggs were taken at Phari, Tibet, on the 3rd June, 1908, at an altitude of 14,300 feet. The bird was common and I saw several pairs making their nests. I also obtained several nests of *M. adamsi* at the same place."

Steen and later collectors again found the nest of this bird in May and June and give similar accounts of the nesting, except that none of them saw any feathers used as lining.

Macdonald sent me one nest with four eggs with the following note:—"I am sending you a new bird, nest and eggs. The nest was of dead grass-stems wound round and across and lined with fur, placed in a hole in a large heap of stones. The bird is the one I send you marked '6'; my boy killed it with a stick as it came out of the hole and then we found the nest." This was taken on the 11th May and contained four fresh eggs, and a second nest was found in a *Lagomys* burrow with three eggs.

The eggs are similar in whiteness, texture and shape to those of *Montifringilla n. adamsi* already described, but are much smaller.

Fifteen eggs average 20.7×15.3 mm. : maxima 21.7×16.0 and 21.5×16.3 mm. ; minima 19.0×12.0 mm. (F. M. Baily).

(1114) *Montifringilla blanfordi* Hume.

THE BLACK-THROATED SNOW-FINCH.

Montifringilla blanfordi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 190.

This Snow-Finch appears only to be found in Sikkim and South and West Tibet.

The Everest Expedition saw a few birds of this species on the Karo La Pass and near Lhasa in July; Mandelli obtained a series of skins from Tibet between March and October, and Arnold Pike shot a specimen in June East of Mangisa Tso in June. Presumably, therefore, this Snow-Finch breeds in many parts of Tibet above 12,500 feet, though in no great numbers. Wollaston records one "nest with young, found two feet down the burrow of a Pika (*Ochotonia curzonii*).

Fringilauda nemoricola.

THE MOUNTAIN-FINCH.

(1115) *Fringilauda nemoricola nemoricola* (Hodgs.).

THE NEPAL MOUNTAIN-FINCH.

Fringilauda nemoricola nemoricola, Fauna B. I., Birds, 2nd ed. vol. iii, p. 191.

The Nepal Mountain-Finch breeds at great elevations in Garhwal, Nepal and Sikkim. Possibly it may also breed in South Tibet, as one specimen was obtained by the Tibet Mission.

Whympers took many nests of this Mountain-Finch in Garhwal between 13,500 and 15,000 feet in July 1910, some of the eggs from which are now in my collection. The birds were breeding on the open hill-sides above the forest, though here and there in the grass were stunted Junipers and creeping Birch. Everywhere there were boulders and stones, but Whympers found all his nests "in holes in the ground, just like rat-holes." The nests he describes as rather rough, untidily built shallow cups of grass lined with feathers and placed some way inside the holes and quite invisible from outside. He took four nests with eggs, three with four and one with five eggs on the 18th and 21st July.

Later on A. E. Osmaston also took nests in Garhwal about which he notes (Journ. Bomb. Nat. Hist. Soc. vol. xxviii, p. 152, 1923):—"This bird breeds in the tract of country lying North of Niti village on the borders of Tibet. They were seen here in the latter half of July and early in August frequenting the open grassy slopes between 13,000 and 14,000 feet elevation. On the 3rd August I found two nests at 13,500 feet elevation, one of which contained three, and the other four, freshly hatched young ones. The nests

were placed within natural crevices which had formed below large stones, half buried in the ground surface on steep bare slopes. As the nests were some 6 inches from the entrance they were perfectly invisible from outside. They were shallow cups composed of dry grass-stems and lined with a few feathers."

The eggs are exactly like those of the genus *Montifringilla*, white, broad ovals with a slightly glossy surface.

Eighteen eggs average 20.6×15.2 mm. : maxima 22.0×16.0 and 20.3×16.1 mm. ; minima 19.5×15.1 and 20.3×14.8 mm.

(1116) *Fringillauda nemoricola altaica* (Eversm.).

THE ALTAI MOUNTAIN-FINCH.

Fringillauda nemoricola altaica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 192.

This Mountain-Finch extends in the breeding season from Ladak, Kashmir, and Gilgit to Tianschan, Samarkand, Altai and Turkestan.

There are a fair number of records of the breeding of this Finch under the name of *sordida*.

It breeds above the forest level at elevations of 12,000 to 15,000 feet on rocky bare mountain slopes or on grass-covered pasture lands. The nest is placed in a hole of some description, either in a burrow of a rat or mouse-hare, in a cleft in, or hole under, a rock or boulder, or in among a heap of fallen stones and boulders. In 1902 Buchanan found this Finch to be "one of the commonest birds in the higher valleys near Sonamarg during the Summer. They did not breed until the middle of July, and I fortunately secured several nests at an elevation of 12,000 to 13,000 feet. The nest is made of grass, and lined with horse-hair and a few feathers ; it is placed in a hole under a rock, and the tunnel leading to the nest is sometimes as much as two feet long ; in two instances the holes were like those made by a rat in open flat ground."

Ward sends me the following note with four sets of eggs :— "Breeds freely in Kashmir between 10,000 and 14,000 ft., nearly always, however, over 12,000 ft. ; most nests are hidden in holes in old stone walls, or in heaps of stones, or under rocks and boulders, but now and then one finds nests in rat-holes or in other burrows in the ground. The nest is just grass and feathers mixed, lined with the latter, very roughly put together and of no particular shape. The eggs number three or four, but once I found two hard set."

Osmaston (B. B.) says of a nest he found in the Suru Valley (Journ. Bomh. Nat. Hist. Soc. vol. xxxi, p. 193, 1926) :—"The nest was in a hole under a big rock on the barren hill-side, and it would not have been discovered had it not been betrayed by the sudden exit of the mother bird. The nest was composed of dry

grass and weeds lined with hair and contained four pure white eggs."

This nest was taken on 24th July and the breeding season seems to extend from early July to the middle of August.

The eggs three or four in number, generally the latter, are the usual white, broad ovals, well pointed at the smaller end. The texture is fine and stout, very like that of the genus *Ploceus* but not quite so thick and smoother.

Twenty-five eggs average 20.5×15.1 mm.: maxima 22.0×15.6 and 21.0×15.7 mm.; minima 19.0×15.0 mm.

***Fringilauda brandti*.**

THE ROSY-RUMPED MOUNTAIN-FINCH.

(1118) ***Fringilauda brandti hæmatopygia*** (Gould).

THE TIBETAN ROSY-RUMPED MOUNTAIN-FINCH.

Fringilauda brandti hæmatopygia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 194.

This Mountain-Finch breeds at extreme elevations in Kashmir, Ladak, Sikkim and Tibet, but there is, so far, nothing on record about its breeding except one nest taken by Macdonald near Gyantse at 14,000 feet.

Osmaston in his article on the "Birds of Ladakh" (*Ibis*, 1925, p. 697) writes:—"This species is common at high altitudes in Southern and Eastern Ladakh between 13,000 and 17,000 feet elevation. They frequent rocky hill-sides and are sometimes seen along with Adams' Mountain-Finch. They are also very partial to wet ground and by streams, where they feed. They are not timid, and will allow themselves to be watched when feeding at quite close quarters. They were noted as specially numerous near the Tso-Moriri Lake (15,000 feet), above Ralma (15,000 feet); Shushal (14,200 feet); all along the Pangong Lake (13,900 feet); and near the Nebok and Khardong Passes at about 16,000 feet.

"All endeavours to find the nest of this species were unsuccessful."

Two nests and eggs sent me, together with the parent birds, were taken, the one above Gyantse in Tibet at about 14,000 feet, the other at the Taglane Pass, Ladak, at 17,000 feet. Macdonald obtained the first in a hole among the stones of a fallen boundary wall, some couple of feet inside. The nest was a very rough affair, scanty and ill put together, made of grass only, but well lined with feathers. It was taken on the 11th July and contained three eggs.

The second nest, taken by F. A. Peter, was found under a large boulder on the lee-side of a ridge, but with snow surrounding it

on all sides. Mr. Peter writes me :—"This nest was found with great difficulty and in bitter cold. Several pairs of birds were about, but we could find no nest until passing a big boulder a bird flew out at our feet. Waiting until it returned I shot it, and then we found the nest two feet under the boulder in a natural hollow. It was a rough cup made of grass and thickly lined with hair. It had four fresh eggs, but I broke one in blowing it. The nest was taken on the 30th July, 1932."

The eggs are just like those of other Mountain- and Snow-Finches except that those taken by Peter are long ovals.

The six eggs average 22.15×16.17 mm. : maxima 23.9×15.5 and 22.0×16.6 mm. ; minima 21.9×16.6 and 23.9×15.5 mm.

Subfamily EMBERIZINÆ

(BUNTINGS).

Emberiza fucata Pall.

THE GREY-HEADED BUNTING.

(1121) *Emberiza fucata arcuata* Sharpe.

THE INDIAN GREY-HEADED BUNTING.

Emberiza fucata arcuata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 199.

This Bunting is found in Kashmir and in the outer hills from Kuman to Garhwal. It presumably breeds throughout this area, but very little is known of its nidification, though Hume found it breeding in the valleys of the Sutlej and Beas and on the hills West of these to Hazara. The nest he describes as "usually placed on the ground, at the root of some little dense tuft of green or stunted bush, or under some large stone well concealed by the surrounding herbage ; but I have had one nest brought to me said to have been found in a bush nearly a cubit from the ground."

"The nest is saucer-shaped, or, perhaps I should rather say, shallow cup-shaped, composed almost entirely of dried grass, and lined with very fine grass-stems and a little hair."

Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, p. 999, 1927) sums up his experience of its breeding as follows :—"This species is found on hush-covered hill-sides in Kashmir, both main and side valleys, at from 6,000 to 7,500 ft., but is nowhere common. They feed on the ground among bushes and dense scrub of *Berberis*, wild rose, *Cotoneaster indigofera* and juniper. The cock has a short bright song, the best of all the Buntings with which I am acquainted. It may be expressed in words as follows :—'chick, cbick—he'll get used to you—chick.'



EMBERIZA STEWARTI.

The White-capped Bunting.

(Wular Lake, Kashmir, 5,300 ft., 28. 5. 21.)

"Nesting commences about the middle of May. The nest is placed on the ground at the foot of some dense low bush on a steepish slope, and is well concealed in grass. It is a very difficult nest to find. It is composed of dry grass and weed-stems, lined with hair. Three or four eggs are laid, which are pale green marked more or less all over with pale ashy brown markings, and with none of the characteristic Bunting lines."

Prior to Osmaston's finding these nests Rattray had taken two nests in Parachinar and in Dunga Gali in the Murree Hills. Nests and sites etc. were as described by Osmaston, but one nest was lined with fine grass instead of Kashmir stag's hair.

The eggs, four and three in number, are of the same character as those taken by Osmaston, but have a pale grey ground stippled all over with blackish-brown, in one egg there being a good many small blotches almost black. In *all* the eggs the markings are numerous everywhere, but still more so at the larger end, nowhere, however, hiding the ground-colour.

In shape they vary from long to short ovals, those taken by Rattray being the bigger, longer and more pointed.

Seventeen eggs average 21.0×15.5 mm. : maxima 22.9×16.0 mm.; minima 19.8×15.0 and 20.2×14.6 mm.

(1124) *Emberiza stewarti* Blyth.

THE WHITE-CAPPED BUNTING.

Emberiza stewarti, Fauna B. I., Birds, 2nd ed. vol iii, p. 203.

Within our limits this Bunting has been found breeding from Afghanistan and Baluchistan to Garhwal.

Wardlaw-Ramsay remarked about this Bunting when writing of Afghanistan:—"This Bunting begins to breed about the end of April; and, during the months of May and June, I found great numbers of their nests. They were almost all situated under roots on sloping banks or hill-sides, and were composed entirely of dried grass."

Rattray and Buchanan in the Garhwal Hills and many oologists in Kashmir have found their nests since Ramsay wrote, but, with the exception of Osmaston and Whymper, must have looked for their nests too late and have therefore found but few.

The notes of all, however, agree with those of Wardlaw-Ramsay. Most birds breed between 6,000 and 8,000 feet, a few higher and a few down to 5,000 feet. For breeding purposes they frequent open hill-sides, sometimes those covered with pasture and low bushes, but often those which are comparatively bare and rocky. The nest is a cup, sometimes shallow, generally rather deep, composed either entirely of fine dry grass or, less often, "of twigs and grass" (Rattray) or "of weed-stems and grass" (Osmaston). The lining is of grass

more or less mixed with hair and sometimes entirely of the latter. The only exception I know of is one found by Rattray "lined with grass and fine roots." It is always well concealed, and is placed on the ground in dense grass or in among the roots of a bush. Other places from which Osmaston has taken nests are "in a cleft in a rock on rocky steep ground," "on a ledge of rock, concealed by a tuft of coarse grass," and often "under a rock" or "under a boulder."

The breeding season commences in April, Osmaston taking eggs as early as the 15th of that month and as late as the 11th June. Rattray took two nests in July, one on the 7th and one on the 8th. Near Quetta Betham took one nest on the 29th of June.

The normal full clutch of eggs is four, but three may often be found incubated, and rarely one finds five.

The ground-colour is a very pale grey often tinged with lilac, freckled all over with reddish-brown intermixed with purple-black or black spots, scrawls and blotches varying much in size and boldness. In many eggs also there are pinkish or purplish blotching and cloudings, while a few eggs have bold definite blotches of purple with underlying clouds and smears of pale grey and neutral tint.

In shape the eggs are moderate ovals, generally obtuse, and seldom at all pointed. The texture is neither very fine nor close and has no gloss.

One hundred eggs average 19.7×14.7 mm. : maxima 21.1×15.0 and 19.6×16.0 mm. ; minima 18.2×14.0 mm.

There seems to be nothing on record about the building of the nest or the incubation.

***Emberiza cia* Linn.**

THE MEADOW-BUNTING.

(1125) *Emberiza cia stracheyi* Moore.

THE EASTERN MEADOW-BUNTING.

Emberiza cia stracheyi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 205.

This, the most common and best known of all our Indian Buntings, breeds in great numbers in the Himalayas from Kashmir to Garhwal and Ladak. It is common in Kumaon also between 5,000 and 8,000 feet, as in the other States, occasionally breeding up to some 1,000 feet higher still. The highest actual record of a nest that I can find is of one taken by Osmaston in the Lidar Valley at 8,700 feet. Hume gives its breeding range as between 4,000 and 9,000 feet, but gives no instances of eggs being taken at either of these extremes. Osmaston, however, says it is common in Kashmir up to 10,500 feet, while he records one specimen at 11,500 feet at Sabu, near Leb, on the 25th July.

This Bunting is found on the wide open hill-sides of Garhwal,



EMBERIZA CIA STRACHEYI.
The Eastern Meadow-Bunting.

(Pahlgam, Lidar Valley, Kashmir, 7,300 ft., 22. 5. 32.)

Kashmir and Kuman interspersed between the forest. It prefers gently sloping hill-sides covered with grass and flowers and a certain amount of bush and scrub, with odd boulders and rocks lying about. It is not found on the barer stone- and boulder-covered hills which seem to appeal to the tastes of *E. stewarti*.

Its nest is placed on the ground under the shelter of a tuft of grass, a bush, a rock or some loose boulder. Generally it is very well concealed but, as the bird sits close, she generally gives away its position.

In the Lidar Valley Osmaston took many nests on rather bare rocky hills, covered here and there with bushes and with a plentiful growth of *Indigofera* between the rocks, and it was among the roots of this plant that most of his nests were discovered.

It does not always, however, keep to the open for breeding purposes, as Davidson records (Ibis, 1898, p. 30):—"It was not uncommon in the thicker forests, and one nest we got there was in the low bough of a fir-tree, about nine feet from the ground."

Often they will make their nests in small natural hollows in banks, both in the open and in forest, and Jones found one nest built in a hole in a road-side cutting in forest, the nest being well hidden by overhanging weeds and grass.

The nest is the usual flimsy Bunting affair; a cup, shallow or deep according to the position in which it is placed, and built of grass with a lining of hair. In most of the nests found by Osmaston a good many weed-stems were mixed with the grass on the outside and some fine grass in the hair lining. Rattray took nests round Murree in some of which the outer walls consisted of roots, grass and fibre, and the lining of grass-stems only.

Hume gives the measurements of the nests as "from 3 to 4 inches in diameter. A nest of this species obtained near Koteghur was a moderate-sized pad of grass, about 5 inches long by about 4 broad, and perhaps 2 inches in thickness. Towards one end of this was a beautiful little saucer-like cavity, perfectly circular, about 2 inches in diameter and 0.75 in depth, lined first with very fine grass-stems and then again, at the bottom of the cavity, with fine white hairs."

The principal breeding season seems to be June and early July, but there are a good many records of its breeding in the latter half of May and as late as the first ten days of August. It does not seem that many birds have two broods.

Hume gives the normal clutch of eggs as four, often three, and rarely five. In my own series—obtained from many sources—three seems to be the number in a clutch at least three times out of four, and five is absolutely exceptional. The only clutch I have of this number is one taken by Whympster near Naini Tal at about 5,000 feet.

The eggs vary very little in appearance and are quite typical of the genus. The ground is almost white tinged normally with grey-blue or pinkish-buff, or, very rarely, with pale dull green. Many eggs have a "plummy" tinge rather than buff. The markings

consist of spots, blotches and scrawls, mostly the latter, of deep reddish-brown or purple-black, with fainter secondary ones of pale reddish. The scrawls are sometimes bold streaks scattered here and there over the surface, but in most cases they are very fine, generally denser at the larger end, where they sometimes form rings of very fine, very long, intertwisted lines.

In shape the eggs are rather long ovals, the texture rather fine and close, sometimes showing a faint gloss, but sometimes quite glossless.

One hundred eggs average 21.5×15.4 mm. : maxima 23.2×15.7 and 21.7×16.8 mm. ; minima 19.4×15.3 and 21.3×14.8 mm.

Both sexes take part in building the nest, but the female alone seems to carry on incubation.

(1126) *Emberiza cia* par Hartert.

THE TRANSCASPIAN MEADOW-BUNTING.

Emberiza cia par, Fauna B. I., Birds, 2nd ed. vol. iii, p. 206.

This subspecies of Meadow-Bunting breeds from Transcaspia to Turkestan, Gilgit and the Baluchistan and Afghanistan boundaries.

It is a very common breeding bird on the North-West Frontier ranges of Afghanistan, and it also occurs in Quetta in Summer at 6,000 feet upwards. Whitehead records (Ibis, 1909, p. 236) :— "It nests, fairly commonly on the Safed Koh up to 11,000 feet." Harington in a letter to me writes :—" *Emberiza strackeyi* is very common up here (Khagan Valley) and I often find several nests in a day. They breed in the open spaces on the hill-sides, between 8,000 and 10,000 feet, which are covered with grass and bracken and sometimes with a few bushes in small patches. The nest is just like it is in Kashmir, a very rough cup of dried grass, lined with the same, and either built under a hush or a tussock of grass or tucked away under a stone, a root of a bush, or hollow in a bank."

To this I can only add that in the notes which accompanied other of his letters he mentions hair as being in the lining of some of the nests taken by him.

Whitehead merely notes that he took one nest "under shelter of briar-root on the ground," and one "hidden under dead bracken. Nest and eggs were quite typical." His nests were taken at Bultakundi at 11,000 feet, so that normally this race seems to build at higher elevations than the preceding one.

The breeding season is June and July. The normal full clutch of eggs is three or four, the latter number rather more often than the former.

They cannot be distinguished individually from those of the Eastern Meadow-Bunting, but a series shows them to be rather more boldly marked. The blue-grey ground is more frequent

than the pinkish-buff, while I have never seen eggs with a greenish ground.

Sixty eggs average 21.7×16.0 mm. : maxima 23.2×16.6 and 23.1×17.1 mm. ; minima 19.2×15.9 and 21.7×15.7 mm.

It should be noted that Sushkin says that both *godlewskii* and *par* breed in Altai and that the former bird must rank as a species.

Emberiza striolata.

THE STRIOLATED BUNTING.

(1136) *Emberiza striolata striolata* (Licht.).

THE INDIAN STRIOLATED BUNTING.

Emberiza striolata striolata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 217.

The range of this Bunting extends from Nubia to the North-West Frontier of India and to Saugur in the Central Provinces.

I can find nothing on record except Hume's notes as to the breeding of this Bunting within Indian limits, but in 1897 Mr. F. E. Kemp wrote to me from Saugur in the Central Provinces to say that he had found nests of *E. striolata*. Two eggs which were in one nest were given to Col. R. H. Rattray, and finally came into my possession. The following year Col. Rattray obtained this same Bunting breeding at Thull, on the North-West Frontier, finding one nest which also contained two eggs. Nest and eggs agree with those taken by Hume.

Hume's account of their nidification is as follows:—"The breeding season appears to be November and December. The natives say that they also lay early in July, at the commencement of the rains; but as to this I can say nothing. On the 12th November, I myself accidentally stumbled upon two nests. I was walking slowly amongst the loose blocks and rocky shingles of the Southern flanks of the Taragurh Hill, when a female suddenly sprang up and darted off from within 2 inches of my foot. I looked down, and there, on the sloping hill-side, overhung by a moderate-sized block of greyish quartz, was a little nest from which the bird had risen, and which I had been within an ace of stepping on. Close at hand were two or three small tufts of yellow withered grass, but these were several inches distant from the nest. This latter (which, laid on the hill-side, was some 3 or 4 inches thick on the valley side and barely three-fourths of an inch towards the hill) was composed at the base and everywhere externally of small thorny acacia-twigs and very coarse roots of grass. This, however, was a mere foundation and casing, on and in which the true nest ~~was~~ constructed of fine grass-stems somewhat loosely put together, the bottom being lined with soft white feathers. The egg-cavity was circular

and cup-shaped, about 2.25 inches in diameter and 1.25 in depth, and contained two chicks and one rotten egg.

"Scarcely twenty yards further, on a slightly sloping slab of stone, partly overhung by a huge block, between two tufts of dried grass, springing from the line of junction of the slab and block, I found a second precisely similar nest containing two fresh eggs.

"The three eggs thus obtained were regular, moderately broad ovals, slightly compressed towards one end, but somewhat obtuse at both. The shells were very delicate, and had a slight gloss. The ground-colour differed somewhat in all three; in one it was pale greenish-, in another pale bluish-, and in the third faintly brownish-, white. All were spotted, speckled, and minutely, but not very densely, freckled with brown; a sort of reddish olive-brown in two, rather more umber in the third. Small clouds, blotches and streaks of the same colour and of a pale purple were intermingled with the finer markings. In two eggs the markings were far most numerous towards the large end, where in one they are partially confluent; on the third they are pretty evenly distributed over the whole surface, being, however, rather denser in a broad irregular zone round the middle of the egg.

"On the 16th I found another nest, precisely similar to that already described, containing two fresh eggs.

"These five eggs have varied from 0.75 to 0.8 in length and from 0.55 to 0.58 in breadth."

Later Hume's men found another nest on a niche in a little temple on the ridge of the Taragurh Hill, and when he inspected this the bird allowed him to watch her within a couple of feet.

The nests were all taken between 1,500 and 2,600 feet elevation, and all were found between the 12th and 19th November.

The eggs taken by Kemp and Rattray agree well with those taken by Hume and with others taken by Petherick in Persia, but they average bigger.

Fifteen eggs, including Hume's, average 20.0×15.0 mm.: maxima 21.3×15.3 and 20.3×15.9 mm.; minima 18.5×14.0 mm.

(1139) *Melophus melanicterus* (Gmelin).

THE CRESTED BUNTING.

Melophus melanicterus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 221.

The Crested Bunting extends throughout the Himalayas from Kashmir to Western China. It is also found, and is resident, in the hilly country of Western India and Rajputana to Lohadagga and Bihar. They breed from the foot-hills up to at least 6,000 feet throughout its range, but in the hills South of the Brahmaputra it certainly breeds up to 8,000 feet and possibly higher, while in the Shan States Livesey records it as "common above 6,000 feet as well as lower down."

This Bunting is a bird of open country, cultivated or covered with grass and scrub, and is especially partial to open rocky hills and the outskirts of towns and villages. The site for the nest varies considerably, and Hume thus sums up his own experiences :—"The nest is placed in holes in banks or walls, on the ground under some overhanging clod or rock, or concealed in some thick tuft of grass and, very exceptionally (I have only seen one such), in a low thick bush within a few inches of the ground."

On Mount Abu Butler found a nest "placed on the ground on the side of a sloping bank by the road-side," and the following year a second nest "situated in a small hollow, behind a tuft of short grass on a sloping bank by the side of a road."

Roadside banks seem to be very favourite resorts, for many other collectors have seen nests on such. Betham remarks :—"A great many nests are built on the banks and road-side cuttings where the hill has been cut away, and by walking along these in July and August they can easily be found as the bird flies off very close to one. They are usually well concealed in small hollows, overhung with grass and weeds, and would not be easy to find but for the birds' departure so close to one. Often they are buried, or half buried, in fallen leaves."

Wenden found five nests on the sides of railway cuttings on the Bore Ghat incline in the Bombay District, and says that he found "all of them in clefts or on ledges of rock within 5 to 10 feet from and from 2 to 15 feet above the rails. One nest was quite exposed to view, but the others were concealed behind weeds or maiden-hair ferns."

In the Naga Hills Tytler found many nests between 6,000 and 8,000 feet, most of them on banks of roadside cuttings, but some under clods and weeds in cultivation or among the growth just starting in abandoned rice-fields.

The nest itself is a cup, sometimes shallow but generally fairly deep, composed of grass and grass-stems, more or less mixed with fine and coarse roots, vegetable fibre and weed-stems, whilst the lining is usually of finer grass sometimes mixed with hair. In the Naga Hills roots seem always to be much used in the outer part of the nest, while the lining is practically entirely "Mithna" hair. On the Mhow Ghats, on the contrary, Betham found that the outer part of the nest was made chiefly of fine elastic twigs and tiny bits of stick, while the lining was always of fine roots.

Most nests are well and compactly constructed, but Hume says "they are often very slight, loosely put together, shallow saucers, composed entirely of fine grass-roots, without any lining."

The breeding season is a very well marked one. Hume says that in the Himalayas the breeding season is from April to June, but neither he nor I have had any April record, and possibly May to early July would be nearer the correct time. Elsewhere July and August are the two regular breeding months and, though a few

eggs may be taken in late June or the first few days of September, the breeding times for all birds vary very little.

The number of eggs in a clutch is three or four, one as often as the other. I have seen no fives and no two showing incubation. The ground is white or white faintly tinged with greenish, lilac or buff, the latter occasionally fairly pronounced. The markings consist of freckles, spots and tiny blotches varying in colour from pale reddish or reddish-grey to deep brown or purplish-brown. Sometimes the spots are rather larger and, in a very few instances, become bold blotches. In most eggs the spots are numerous everywhere and especially dense at the larger end, but the bigger the blotches the fewer in number. There are no typical Bunting scrawls and lines and the eggs are more Lark- than Bunting-like in appearance.

In shape they are normally broad ovals, very obtuse, and but little compressed at the smaller end.

Sixty eggs average 20.1×15.6 mm.: maxima 21.3×15.2 and 21.1×16.7 mm.; minima 17.9×13.9 and 18.1×13.0 mm.

The male bird, according to Betham, takes no part either in the construction of the nest or in incubation, but spends his time, when not feeding, in singing lustily near where his wife is sitting on the nest.

Family HIRUNDINIDÆ

(SWALLOWS and MARTINS).

Delichon urbica *.

THE HOUSE-MARTIN.

(1141) *Delichon urbica urbica* (Linn.).

THE EUROPEAN HOUSE-MARTIN.

Delichon urbica urbica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 226.

Within our limits this House-Martin breeds in Gilgit, perhaps Northern Kashmir, and commonly in Ladak, where one would have expected either *cashmeriensis* or *whiteleyi*. It apparently breeds nowhere in Central and Southern Kashmir, and I cannot think that the record of its breeding in Mysore, recorded by Major Coussmaker in Hume's 'Nests and Eggs,' can be a correct one.

Osmaston gives (Ibis, 1925, p. 699) the only note I can find which really refers to this race:—"Fairly common in Ladakh in the main

* Ticehurst considers that *urbica* and *cashmeriensis* are full species, separated specifically by the depth of forking of the tail, deep in *urbica*, shallow in *cashmeriensis*. They seem, however, to have definite breeding areas and, for the time being, I retain them as races only.

and side valleys between 10,000 and 13,000 feet and occasionally, as at Nimu Mud, at 14,000 feet. They were seen building their nests under overhanging rocks on the steep cliffs along the Gya Valley at 12,000 feet on 3rd June. Two birds were shot here for identification, and they proved to be *D. u. urbica* and not *D. u. cashmeriensis*, as one would have been led to expect.

"They were also breeding on the Lamasery cliffs on Nimu Mud (14,200 feet) on 28th June, and again at Tankse (12,900 feet) on 12th July. All these nests were inaccessible. On the 18th July, by the Shyok River at 10,500 feet, three nests under an overhanging rock by the river were examined. One contained three fresh eggs.

"Nests and eggs resembled those of the English House-Martin. Two eggs measured 19.3×13.7 and 19.5×14.0 respectively."

In 1905 Ward also obtained birds, nests and eggs from Tankse, but at about 13,000 feet, on the 20th June. These were sent to me as "*kashmiriensis*," but identified by me as typical *urbica*. This nest was said to have been built under the eaves of a hut and close to a colony breeding under a cliff.

The eggs are, of course, pure white of a very soft smooth texture, but not glossy, and rather brittle for their size. In shape they are rather long ovals.

In 'The Handbook of British Birds' Jourdain gives the average of fifty-four eggs as 19.4×13.2 mm.; the only Indian eggs I have seen are about the same.

(1142) *Delichon urbica cashmeriensis* Gould.

THE KASHMIR HOUSE-MARTIN.

Delichon urbica cashmeriensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 228.

This House-Martin ranges from Afghanistan to Sikkim through Central and South Kashmir and Kuman and the outer hills. So far as I can ascertain they breed from about 5,000 feet up to about 8,000 feet, but I can find few records of their breeding at the great elevations frequented by the preceding bird, nor do they breed in Gilgit, whence the only breeding birds I have received have been typical *urbica*. At the same time it has been recorded that the latter bird does breed down to 5,000 feet in Gilgit, where also *cashmeriensis* has been said to breed up to 12,000 feet, while Ward refers to a colony breeding near Astormarg at 12,000 feet. In the British Museum also there are specimens of both birds received from Leh, obtained in the Summer months and presumably breeding.

The nest is just like that of the European House-Martin, a mud cup placed against a wall or cliff in such position that an overhanging rock or the eaves of the house form the roof to the nest.

The mud walls are formed of innumerable little pellets of mud obtained by the birds from any puddle, pool, lake-side, or river-side, worked into tiny almost liquid balls in the beak, and then attached to the sustaining wall and later to the fabric of the nest itself as this

gradually increases in size. A small aperture, a little over an inch across, is left at the top, adjoining the rock roof and, finally, a dense lining of soft feathers is added. Sometimes scraps of grass, straw etc. are mixed with the feathers, but this is not usual.

In India the normal breeding place is a cliff-face. On the North-West Frontier Whitehead found them "fairly numerous in Summer along the Safed Koh Range, nesting either singly or in small colonies under overhanging crags from 6,000 to 8,000 ft."

Pitman found them breeding "in small colonies under rocks, on cliffs" round Dera Ismail Khan. In the Danga Gahis Rattray saw colonies breeding on cliffs and many individual birds building under the eaves of houses and in verandahs. Finally, in Kashmir, though most birds breed in large or small colonies on cliff-faces, Ward and others have obtained many nests built under the eaves of houses.

The breeding season is June and July, though Pitman found one nest containing four fresh eggs as early as the 14th May.

The eggs number three or four in a clutch and are similar to those of the European House-Martin, but are much smaller.

Eighty eggs average 17.9×12.7 mm.: maxima 19.6×13.0 and 19.2×13.5 mm.; minima 16.0×13.1 and 17.0×12.2 mm.

(1144) *Delichon nipalensis* Horsf. & Moore.

THE NEPAL HOUSE-MARTIN.

Delichon nipalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 230.

This little House-Martin is found on the Outer Himalayas from Naini Tal to Eastern Assam and in Cachar and Manipur.

In July 1893 I had a nest, four eggs and a bird of this species brought in to me by Cacharies, said to have been taken from a cliff under their village. In 1895 I visited this village at the end of April, and there saw the Martins not only flying about on the cliff-face below me but also in and out of the houses as well. The village, Banko, was built on a promontory overhanging a very steep rocky cliff, at the bottom of which ran the Boila stream, there forming the boundary between North Cachar and the Naga Hills. The colony, perhaps thirty or forty pairs, had their nests built in clusters under overhanging rocks near the top of the cliff, one such cluster being under a rock which formed a site for one of the houses. *Inside* this house, and affixed to the massive wooden beams which supported the roof, were three half-built nests, exactly like those of English House-Martins, fixed in corners under the beams. Later one of these nests, four eggs, and the parent birds were brought to me. The nest, naturally much broken, was exactly like that of the other House-Martins, made of pellets of mud and lined densely with feathers, mostly of domestic fowls, but also of the Great Himalayan Barbet and of Green Pigeons.

The colony of nests on the cliff could not be got at even with ropes, but we could see them very distinctly from the stream below. The Cacharies told me that the principal breeding season was in April and May but that many birds had second broods in July.

In 1908 Whympers found them breeding near Naini Tal, and thus records his find (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 909, 1909) :—" I have been on the look-out round Naini Tal for several years for the nests of *Chelidon nepalensis*, a resident species apparently, and last December, while taking a Lammergeyer's nest, we were overjoyed to see a vast number of mud nests on the cliff and a good number of *Chelidon nepalensis* hawking round them. The nests were mostly in inaccessible places, but after a prolonged survey we decided that some of the lower nests might be got at. So on April the 3rd we went with ropes and long bamboos, but found to our horror that twelve common bees-nests were scattered about among these lower nests, making it quite impossible to attempt them. Very high up, however, there was one small new colony free from bees, and although it seemed impossible to get at them, my men by climbing up to a narrow ledge, drawing up bamboos and lashing them together, succeeded in reaching this small colony of about twenty nests. It was a fine feat of climbing, and our grief was great when we found nearly all the eggs too hard-set to blow, and only eight of them were saved. I calculated there were over 3,000 nests in sight, there being three main colonies of about seven hundred nests in each and many smaller colonies. The nests were in masses touching each other, mostly under overhanging cliffs, but in some cases they were exposed to the weather, and the foot of the cliff was covered with a débris of fallen nests and droppings to a depth of several feet. The nests and eggs resemble almost exactly those of the Kashmir Martin; the elevation is about 4,500 feet above sea-level."

Later, in 1917, on the 10th June, Whympers discovered another colony breeding in Tehri Garhwal at an elevation of 13,000 feet but again was unfortunate, and only succeeded in obtaining five eggs which were blowable.

A. E. Osmaiston also found colonies in Garhwal hut at much lower elevations, i. e., 7,000 feet. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xxviii, p. 153, 1921) :—" In 1913 I obtained eggs on the 19th June, but in many nests the young had already been hatched. In one favoured spot I counted 50 nests built over a space of about two square yards. The cliff where the birds were nesting is in the middle of a hanj (*Quercus incana*) forest." This colony did not make tubular entrances to their nests.

The eggs are only distinguishable from those of the European House-Martins by their small size.

Twenty-one eggs average 18.6×12.8 mm. : maxima 20.0×13.1 and 18.3×13.4 mm. ; minima 17.2×12.7 and 19.6×11.3 mm.

Riparia riparia (Linn.).**THE SAND-MARTIN.****(1146) Riparia riparia subsoccata Gray*.****THE SMALL SAND-MARTIN.**

Riparia riparia subsoccata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 233.
Riparia riparia indica Ticehurst, ibid. vol. viii, p. 658.

This little Sand-Martin breeds over the whole of Northern India from Afghanistan, through Kashmir, Garwhal, Nepal, Sikkim to the Buxa Duars, while South it extends to Sind, the Punjab, United Provinces and Bihar. Eastwards of this in Bengal its place is taken by *ijima*.

Hume, after discussing the distinctiveness of this Sand-Martin from *C. sinensis*, says:—"On the 11th Jan., 1867, I came on a colony of Sand-Martins breeding in the high sandy banks of the Jamna. I shot two of the birds and got some eggs. I revisited the spot on the 12th March and again shot a pair of birds and obtained more eggs.

"They build in communities in sandy banks overhanging rivers. They bore small holes, about 3 inches in diameter, from 1½ to 3 feet deep, into the bank, usually sloping a little upwards, at the end of which they scoop out a sort of chamber, say 6 inches in diameter; there they make a nest of very fine twigs and grass lined with a few soft feathers of the wild goose, brahminy and such-like water-fowl. They lay from two to three eggs."

The other descriptions given of the breeding of the Sand-Martins in Hume's 'Nests and Eggs' may in some cases apply to more than one species or subspecies, so I do not quote further from them.

Pitman obtained a fine series of skins and eggs at Dehra Ismail Khan in March 1914 from a big colony breeding in a shallow pit.

This Sand-Martin undoubtedly breeds for choice in the sandy banks of rivers, but it has also been found breeding in borrow-pits by roadsides, banks of lakes and ponds where these are suitable for the purpose and, often, in roadside and railway cuttings. Gill also records finding a colony of upwards of a hundred couples with all the tunnelled nests driven into the face of a mud cliff some fifteen feet square, the little apertures being only inches apart (Journ.

* When writing vol. viii of the 'Fauna' I accepted Ticehurst's reasons for the name *subsoccata* being untenable because it had been cited by Horsfield and Moore as a synonym of *sinensis* (Cat. Birds in Mus. E. I. Co. p. 96, 1854). I find, however, that the name is founded by Hodgson on specimen E in the Indian Museum, while there is also a drawing of the Sand-Martin from Nepal. Because Horsfield and Moore *wrongly* cite this name as a synonym of *sinensis* it does not thus become invalidated, and must be used, but the reference must be to Gray (ex Hodgson), Zool. Misc. p. 32, 1844.

Bomb. Nat. Hist. Soc. vol. xxix, p. 765, 1924, under the name *C. sinensis*).

The tunnels vary in length according to the soil, but generally in easily workable, but sound, sand-banks they vary from $1\frac{1}{2}$ to 3 feet in depth. In very easy yet still firm sand-banks they may run up to 6 feet; while in hard soil I have seen tunnels which, excluding the chamber, were under 6 inches. The nests consist of a handful of grass, roots, small leaves and leaf-stalks and, according to Hume, small twigs, with a lining of feathers. Both lining and nest vary much in bulk. I have seen some which could be held in one hand and others which must have contained several handfuls of material.

The breeding season varies according to the normal time for the rising of the rivers etc. The tunnels are usually begun in November, December and January, eggs being laid any time between December and March, a few not until April.

The number of eggs laid seems to vary a good deal in the various colonies. In Nowshera Buchanan took many numbering five, but Jones (Attock), Whistler (Jhelum), Pitman (Dehra Ismail Khan), Rattray (Jhelum) and many others have found two or three to be the normal clutch and larger numbers exceptional.

The eggs of all the species of *Riparia* are small replicas of House-Martins, pure white glossless eggs, of fine soft surface and brittle texture.

Forty eggs average 16.5×12.1 mm.: maxima 17.3×12.3 and 16.9×12.6 mm.; minima 15.4×12.0 and 16.9×11.3 mm.

(1147) *Riparia riparia ijimæ* (Lönnb.).

THE EASTERN SAND-MARTIN.

Riparia riparia ijimæ, Fauna B. I., Birds, 2nd ed. vol. iii, p. 234.

The Eastern race of the Sand-Martin is found within our area in Cachar, Sylhet and Upper Assam, Manipur, Burma and Shan States. In Sakhalin, whence the type was described, Professor Ijima found this bird breeding in the cliffs along the sea-shore. In Assam small colonies, seldom exceeding forty pairs, were common all along the Surrma and Brahmapootra wherever there were suitable banks. I also found them on the North of the Brahmapootra breeding in the streams wherever these had clear running water and sandy banks. Where the banks were earth, or even earth and sand, there were no Sand-Martins. I did, however, also find a few birds breeding in sandy borrow-pits beside roads and, on one occasion, found them breeding in one of these in company with Bee-eaters and a Kingfisher.

Tunnels, nests and eggs differed in no single respect from those already described for the preceding bird, but it may be noted that

the chambers, about 6 inches wide each way, were never more than 3 inches in height.

In Assam the birds commenced tunnel work as soon as the rivers fell in September, and I have taken eggs as early as the 6th October. Most eggs were laid between the 15th of this month and the end of November, but there seemed to be a recrudescence of breeding in March and early April, though these nests were constantly flooded out before the young had flown.

The normal clutch was four to six, and I do not remember ever finding twos and threes showing any sign of incubation.

Unfortunately at that time the status of the different races of Sand-Martin was not known, and I did not trouble to take many eggs, and most of those I did take were given away.

The average of twenty eggs is 17.5×11.9 mm. : maxima 18.5×12.1 mm. ; minima 14.9×11.0 mm.

Both species of *Riparia* nested in the banks of the Brahmapootra within 100 yards of my bungalow in Dibrugarh, but each species kept entirely to itself and I never found them mixed.

Riparia paludicola (Vieill.).

THE AFRICAN SAND-MARTIN.

(1148) *Riparia paludicola brevicaudata* (Horsf.).

THE INDIAN SAND-MARTIN.

Riparia paludicola chinensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 235.

Riparia paludicola brevicaudata, ibid. vol. viii, p. 658.

This little Sand-Martin, distinguished by its bare tarsi, is found over the whole of India as far South as the Bombay Presidency and the Deccan on the West, and as far as Cuttack in Orissa on the East. In Burma it occurs as far South as Tenasserim and East it extends through the Indo-Chinese countries to South China.

There is little one can say about the breeding of this Sand-Martin in addition to what has already been written about the others.

In Assam we had colonies of this bird breeding within a few yards of colonies of the preceding species, and one could not tell which was which until a bird was caught and examined. We found both species extremely tame and confiding. The Dibrugarh bazaar was built right on the edge of the Brahmapootra, which frequently washed away a portion of it during the rains, yet in the bank under the bazaar both species of Sand-Martin yearly bred. In many cases the chambers containing the nests were sufficiently far in to come right under the shops and houses, so that there was a constant movement of traffic a few feet over the birds' heads. In these colonies it seemed certain that often two birds laid in the same chamber. Clutches of six were common, in most cases all laid

by the same bird, but I also found sevens and eights which certainly looked as if laid by two birds, some being small and broad, others bigger and longer. The tunnels made by these particular colonies ran from 18 inches to 4 feet, but averaged about 3 feet, the soil being very compact sand. Elsewhere I have found colonies where nesting tunnels averaged less than a foot, and the length seems to depend entirely on the soil in which they are excavated.

The nest is typical of the genus and needs no separate description, but in the colonies under the Dibrugarh bazaar I found much cotton, bits of string, scraps of cloth and paper and some loose jute used as material, all being stuff the birds picked up off the surface of the river.

Everywhere the breeding season is the same, October to February, when the river-banks are safe from flooding. Rarely, as in Assam, a second brood may be raised in April and May.

The normal clutch varies from two to four in the greater part of India; in Assam it is five or six, and in Burma three or four.

One hundred eggs average 17.0×12.0 mm. : maxima 18.3×11.9 and 17.6×12.7 mm. (Hume); minima 14.5×11.2 mm.

(1149) *Krimnochelidon rupestris* (Scop.).

THE CRAG-MARTIN.

Ptyonoprogne rupestris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 236.

Krimnochelidon rupestris, ibid. vol. viii, p. 658.

The Crag-Martin breeds in North Africa, South Europe, Western Asia East to Turkestan, Tibet and Western China. Within our limits it breeds in the Himalayas from the Afghan and Baluchistan boundaries to Western and Southern Tibet and to Kuman.

Fulton says that this bird is a common visitor to Chitral up to 13,000 feet, while Whitehead says that it is probably resident on the Samana and that "fair numbers nest in the precipices of the Safed Koh." Marshall and Betham found it common on the hills round Quetta; Rattray took numerous nests in the Murree Hills; Osmaston and Ludlow record it as being numerous in Ladak up to 15,000 feet, and the latter says it is equally so at Gyantse, 12,000 to 14,000 feet, though the nests are inaccessible. In Hume's time there was a colony breeding on the road from Mussoorie to Simla at about 6,000 to 7,000 feet.

In the Murree Hills, also, Rattray took nests at 7,000 feet, but they breed generally at far higher elevations than this.

In Ladak Osmaston says (Ibis, 1925, p. 699):—"This is a common bird wherever there are rocky precipices in the vicinity of water. They are found from about 9,500 up to 15,000 feet.

"They were observed on May 1st soon after crossing the Zoji La. On 7 May they were seen building at 10,000 feet in the Wakka Nala, and again on 3 June building in the Gya Valley at 12,000 feet. They also breed near the Tso Moriri Lake at 15,000 feet.

"Nests are placed under overhanging rocks on precipices. They are usually difficult or impossible to reach.

"On 1 August at Bhotkarbu (11,500 feet) a nest was found containing four fresh eggs, three of which were with difficulty secured.

"Nests are similar to those of the English Swallow."

Nests and eggs sent to me from Gyantse were said to have been attached to rocks under ledges or other overhanging rocks, always over rivers and most difficult to reach. The eggs numbered three or four and the nests were cups made of mud pellets and thickly lined with feathers, mixed with scraps of straw, grass and other oddments. Rattray found the nests in Dunga Gali built inside crevices between rocks, but otherwise similar in construction.

The breeding season is from the end of May to the first week in August, the latter date being exceptionally late, while most eggs are laid in the second half of June and early July.

The eggs number three or four and are like rather boldly marked eggs of the Common Swallow. The ground is white, speckled and spotted, chiefly at the larger end, with pale reddish-brown, grey-brown or purple-brown. In some eggs the markings are very fine and speckly, in others larger and more blotchy and, as a rule, the larger the blotches the deeper and more handsome the colour.

In shape the eggs are long ovals, the texture not very fine and quite glossless, and the shells very fragile in proportion to their size.

Twenty eggs taken in India average 21.2×14.3 mm. : maxima 22.9×14.5 and 22.8×15.0 mm. ; minima 20.1×13.9 mm.

Krimnochelidon concolor.

THE DUSKY CRAG-MARTIN.

(1150) **Krimnochelidon concolor concolor*** Sykes.

THE INDIAN DUSKY CRAG-MARTIN.

Ptyonoprogne concolor, Fauna B. I., Birds, 2nd ed. vol. iii, p. 237.

Krimnochelidon concolor, ibid. vol. viii, p. 658.

With the exception of Sind, the Dusky Crag-Martin breeds from the Nilgiris in the South to the Himalayas in the North, while East it extends to Bihar and the drier districts of Western Bengal.

This Crag-Martin does not breed in colonies, but sometimes two, three or even four nests may be found quite close together on the same rock or building. Usually, however, the nests are quite solitary.

The sites selected vary greatly. Often they are built on houses and other buildings under the protection of the eaves or some other portion which hangs well over the nest. At other times they

* Mr. T. R. Livesey having recently discovered a new form of *concolor* in the Shan States, our bird has to have a trinomial.

are placed under bridges, on the walls of wells (B. Aitken), the walls of forts and mosques etc. Perhaps, however, they most often make their nests under some rock, or ledge on the faces of cliffs and precipices or lofty banks of rivers. Wherever, however, it may be situated it seems invariably to be protected above by some portion of the building or rock which projects above it.

Miss Cockburn found in the Nilgiris "one nest constructed in a small cave which had been dug out of the earth, where some pretty moss and ferns were growing." Williams found a small colony breeding on the rocks near the Laws Falls on the Coonoor road, where, in addition to being overhung by rocks, the nests were "partially concealed by small tufts of maiden-hair fern."

The nest is a typical Swallow's nest, an open half-saucer made of pellets of mud and lined with feathers and odd scraps. Blewitt says that the nests he found were lined with feathers and the flowering ends of grasses, while Betham found one nest lined with grass and just a few feathers.

The birds have two fairly well defined breeding seasons almost everywhere, the first in February and March, the second after the Rains have broken in July and August. At the same time nests and eggs may be found in practically every month of the year.

In January they have been taken by Sparrow in the Deccan and by Betham at Baroda. In February Butler obtained eggs in Belgaum and Davidson and Wenden in Sholapoor. In March eggs have been taken in many places: in Poona (Aitken); Sholapoor (Davidson and Wenden); Rajputana (Barnes); Central Provinces (Thompson and Williams); Belgaum (Butler). In April they have been found in the Nilgiris (Cockburn, Cardew, Wilson etc.); Rajputana (Barnes); Central Provinces (Thompson); Trimulgherry (Sparrow). May has produced eggs on the Nilgiris (Cockburn) and in Wellington (Williams) and in Poona (Aitken). During June, July and August nests with eggs have been taken in the Nilgiris (Blewitt); Aboo, Deesa and Belgaum (Butler); Sholapoor (Davidson and Wenden); Rajputana (Barnes); Saugur (Thompson); Poona (Betham); and Trimulgherry (Sparrow). Butler also took eggs in Deesa in September and October, and in the latter month Bingham found fresh eggs in Allahabad.

We thus have only the two months November and December in which eggs have not been recorded.

The number of eggs in a clutch is two to four, though once Betham took five eggs in Guzerat.

In appearance they are quite typical Swallow's eggs, but are broad and not long ovals as a rule. Texture and surface are quite normal.

One hundred eggs average 17.6×12.8 mm.: maxima 19.2×14.0 mm.; minima 16.1×12.9 and 16.5×12.0 mm.

Both parents assist in constructing the nest and both apparently take part in incubation.

Krimnochelidon obsoleta (Cabanis).**THE PALE CRAG-MARTIN.****(1151) Krimnochelidon obsoleta pallida* Hume.****THE SIND PALE CRAG-MARTIN.**

- * *Ptyonoprogne obsoleta obsoleta*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 238.
Krimnochelidon obsoleta pallida, ibid. vol. viii, p. 659.

As now restricted this race has a breeding range over Persia, Afghanistan, Baluchistan, Sind and the Mekran coast.

The first record of this bird's breeding within our limits is that of Butler, which may or may not be correct. The birds were said to have been breeding with several pairs of *H. rustica* in the verandah of one of the telegraph-houses at Jask on the Mekran coast. The nest, which was fixed to one of the rafters of the roof of the verandah, is described as having been exactly like that of the Swallows, as were the eggs.

The only other records are those of Rattray, who on three occasions took the eggs of this bird at Hassan Abdul, Khar and Thull on the North-West Frontier, and of Williams, who found them breeding commonly in the hills near Quetta. The following is a summary of Rattray's notes:—"Three single clutches were each taken from small scattered colonies of Swifts which were breeding on the faces of rock-cliffs. In each colony only the one nest was accessible; one nest was only 7 feet from the ground, but the others were at great heights. The nests were deep half-cups made of the usual small pellets of mud and lined with grass and feathers, in varying proportion. All the nests we could see well were placed under the projecting ledges or rocks, so that they were well protected from rain and storm. What the normal clutch is I cannot say, but the three nests taken 4.6.93, 6.4.98 and 4.5.06 held respectively 2, 3 and 2 eggs. In appearance these are just like those of *Hirundo rustica*. All the colonies were situated at about 4,000 feet elevation."

It is, of course, impossible to generalize from so small a series of eggs, but it is striking that all of these few are long ovals in shape and not broad as in *concolor*. They are white, freely speckled and spotted at the larger end, sparsely elsewhere, with purplish-black, these spots forming rings in the three clutches.

The seven eggs average 19.4×12.9 mm. : maxima 20.0×12.7 and 19.9×13.0 mm. ; minima 18.9×12.9 and 19.4×12.0 mm.

* Since the 'Fauna' was written good series of Sind birds have been obtained, and these show that they are markedly darker than the African birds, and Hume's race must therefore be maintained.

Hirundo rustica.**THE SWALLOW.**(1152) **Hirundo rustica rustica** Linn.**THE COMMON SWALLOW.***Hirundo rustica rustica*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 240.

In the 'Fauna' I pointed out that many specimens of this Swallow obtained in Kashmir were by no means typical, yet others could not be distinguished in any way from the European bird. I still find it impossible to give any constant character by which to separate the two, and I retain my distribution of the various races as given in the 'Fauna':—"Breeding in Europe, North-West Africa, West Siberia to the Yenesei, Asia Minor, Himalayas from Kashmir to Sikkim, Tibet and the Assam Hills."

In Kashmir and elsewhere in India the Swallow is the same confiding bird that it is in England, and is even bolder in selecting building sites. In Srinagar almost every shop and other building has one or more, generally more, nests in it, built at any height from 6 to 9 feet, so that the occupants passing in and out almost touch them. The people encourage them to build, and place small boards under the nest to catch the droppings and rubbish below them. In other places the natives put up little boards under the eaves and rafters upon which the Swallows make their nests.

In some buildings the birds build in considerable numbers. Thus in the Post Office at Srinagar Osmaston found eight nests in one room which was daily closed "*entirely*" at 5 P.M. every evening until the next morning, but Osmaston does not say whether the birds were shut in or out.

The nest is so well known that any further description seems superfluous. As in England, so in India, the Swallow builds an open saucer- or semi-saucer-shaped nest of tiny pellets of mud well lined with feathers, feathers and grass or, very rarely, soft feathery grasses alone.

The principal breeding season is April and May, but in Almora Whympers took full clutches of eggs as early as the 20th March, many nests having their full complement on that date. On the other hand many birds breed in June, and I have eggs taken as late as the 27th July. They certainly have two broods *as a rule* in the year, and sometimes three. Gammie says that in Sikkim "they breed at least twice in the season and I think, occasionally, three times. On the 29th April I took a nest containing five hard-set eggs out of a kutchha bungalow, and on visiting the same place on the 20th June found that the same pair had, in the interim, built a rough nest and reared a brood, which had flown about four days

before, and the parents were busy repairing the nest for a third batch of eggs."

The number of eggs laid is four to six, five being the number most often laid and six only exceptionally.

The eggs are white, dotted and speckled with roddish-brown or purple-brown, most numerous at the larger end, where the spots sometimes form zones. Sometimes the spots are chestnut-red, and Whymper found one clutch marked with large blotches of deep red-brown. As a series the eggs of Indian birds are, perhaps, more richly marked than those of the European ones.

In Witherby's 'Practical Handbook' the average of fifty European Swallows' eggs is given as 20.2×13.9 mm. The average of one hundred Indian-taken eggs is 19.8×13.7 mm.; maxima 22.8×14.0 and 22.1×14.2 mm.; minima 17.9×12.1 mm.

Both birds share in the work of nest building.

The period of incubation in Kashmir is 14-15 days, but in Europe Witherby gives the period of incubation as 15 days (Owen) and the fledgling period as 21 days.

(1153) *Hirundo rustica gutturalis* Scop.

THE EASTERN SWALLOW.

Hirundo rustica gutturalis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 241.

In the 'Fauna' I gave the breeding area as "Eastern Siberia from the Yenesei to Japan. Breeding birds from the high desert countries of Afghanistan, Baluchistan, Gilgit, Ladak, Northern Tibet and North-West China and all those breeding in the mountains South of the Brahmaputra must be accepted as this form. Birds breeding in Cachar, Manipur and the hills of Northern Burma are also referable to this race."

Whitehead says that this Swallow (he calls it *rustica*) "is a fairly common resident in the Miranzai Valley, nesting freely at Thull (2,550 ft.)." Cumming says that it is a Summer visitor to Seistan, only 1,700 feet, and Perreau records it as common in Chitral as a breeding bird. None of these observers give any account of the breeding beyond saying that it does undoubtedly nest in all these places.

The only other records of the breeding of the Eastern Swallow in India are those of the nests taken by myself in Assam and others taken by Betham at Quetta.

In North Cachar this Swallow seemed to breed only occasionally, and then at elevations over 4,000 feet, though in 1891 and 1892 two pairs of birds made their nests in my bungalow on Gunjong, which was only 2,500 feet elevation, while a few other pairs nested in the village below my house. With these exceptions a nest taken at 4,500 feet was the only one I actually saw *in situ* under 5,000 feet.

Godwin-Austin, however, took nests and eggs at Asalu, also under 3,000 feet, where he says these birds nested in the high roofs of the Naga houses. In the fifteen years I was in North Cachar I never saw a single nest in Asalu, but at Hungrum, 6,000 feet, the birds bred regularly, and in the adjoining Naga Hills, 6,000 to 9,000 feet, they also nested yearly.

The nests in my own bungalow were placed on projecting bits of rafter where these crossed under the ends of beams. In the Naga houses they always selected rafters near the apex of the roof.

The nests I took in North Cachar all had full clutches of eggs on dates between 9th April and 31st May. In Quetta Betham took clutches on the 6th and 23rd May; the birds he describes as common but, as they only bred in the houses of the Pathans, they were not easy to get. Marshall also says this Swallow is common in Quetta. In China they breed from March to the end of May, making their nests in mosques, temples and houses.

Nests and eggs are exactly like those of the European Swallow, but average smaller.

Eighty eggs average 18.9×13.4 mm.; maxima 21.7×13.8 and 19.7×14.2 mm.; minima 17.0×13.3 and 17.7×12.6 mm.

Hirundo javanica.

THE SMALL HOUSE-SWALLOW.

(1155) *Hirundo javanica javanica* Sparrm.

THE JAVAN SMALL HOUSE-SWALLOW.

Hirundo javanica javanica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 243.

This little House-Swallow extends from Arakan to Tenasserim and thence to Java, Sumatra, Borneo, Philippines and other islands. It also breeds in the Andamans.

The only record of this bird's breeding noted in Hume's 'Nests and Eggs' is that of Theobald, who says that in Tenasserim it "lays in the second week in April. Nest a saucer of mud; inner part coarse roots, profusely lined with feathers and vegetable down, attached to the under parts of snags projecting some 4 feet above the water."

Hopwood found it breeding on the sea-coast in Arakan, its northernmost limit, while Anderson and Osmaston took numerous nests in the Andamans.

The nests are built either in small scattered colonies or, more often, singly, on cliffs or rocks or, less often in Burma and the Andamans, more often in Sumatra, Java etc., under the eaves of buildings. In Tenasserim Hopwood found them breeding on a high cliff overlooking the sea, about 18 feet from the top and nearly 30 feet from the base but easily approached from above. In the Andamans

they bred both on rocks, under the shelter of an overhanging ledge, or in small caves on the sea-shore. All these nests seem to have been built quite low down, sometimes within 4 or 5 feet of the ground.

The nests are the same, wherever built—typical little nests of Swallows, half saucer-shaped and made of tiny pellets of mud with a lining of soft feathers. The coarse roots and vegetable down mentioned by Theobald must have been quite abnormal, though often small oddments of grass etc. are picked up by the birds when collecting mud.

In Tenasserim and Arakan the breeding season is, so far as yet known, March and April but, in the Andamans, eggs were taken from the first week in May to the end of June. It appears, therefore, that they are single brooded, though information is incomplete on this point.

The eggs number two to four and are just small replicas of the eggs of the Common House-Swallow, but are, perhaps, a little broader in proportion to their length. A comparatively large proportion of the eggs are rather heavily and richly marked with chestnut-brown. As in the eggs of their larger relatives, secondary spots are very few in number and often entirely absent. When present they may be either pale washed-out reddish-brown or pale neutral tint.

Forty eggs average 17.5×12.7 mm.: maxima 19.0×13.0 and 18.3×13.1 mm.; minima 16.0×11.9 mm.

(1156) *Hirundo javanica domicola* * Jerdon.

THE NILGIRI SMALL HOUSE-SWALLOW.

Hirundo javanica domicola, Fauna B. I., Birds, 2nd ed. vol. iii, p. 244.

The breeding range of this Swallow is Ceylon and the hills of South-West India to the Nilgiris. In Travancore it is common from 4,000 feet upwards, while in the Nilgiris it has been recorded down to as low as 3,000 feet. In Ceylon it frequents the higher ranges and is very common near Newara Eliya, but has also been recorded occasionally at 2,000 feet.

Both in Ceylon, the Nilgiris and in Travancore this Swallow makes its nest either on rocks, road-side cuttings or under the eaves of houses. Wait ('Birds of Ceylon,' 2nd ed. p. 127) writes:—"The most familiar Swallow in the higher hills. The birds often have a regular beat and are fond of the steep-sided railway cuttings through cabook (laterite), which are so common on the up-country line. They are fearless of man and frequently build their nests in the eaves of verandahs or even inside rooms. They are, however, equally ready to breed on little ledges on the face of rocks, or in

* As pointed out in vol. viii, p. 639, of the 'Fauna,' Kloss considers *domicola* and *javanica* to be races of *tahitica* Gmelin.

cabook cuttings, and I have found the nest in the entrance of a railway tunnel."

In the Nilgiris, Miss Cockburn writes (Hume's 'Nests and Eggs'), they "appear to prefer erecting their little nests in verandahs and eaves of outhouses," while Wait found them placed both under eaves and under bridges, open sheds etc., and Morgan also found nests on large rocks and cliffs.

The nest is generally so built that it is more or less protected from the weather, for it is just the usual open half-saucer of mud-pellets lined with feathers, and is soon damaged or completely destroyed by storms or heavy rain. Occasionally two or three pairs of birds may build in the same verandah or building, but they never nest in colonies.

Wait gives the measurement of a Coonoor nest as $2\frac{1}{2}$ inches in diameter.

Davison says that in the Nilgiris the breeding season is from February to April, two broods being reared in quick succession. Packard found that most eggs at Ootacamund were laid in March. Cardew took some in April, and Howard Campbell took them from March to June, two broods being almost invariably hatched.

In Ceylon Wait gives the breeding season as "April to June and again in September," while Tunnard took eggs in December and March, but observed birds commencing to build a nest in October which, though not deserted, contained no eggs until December. The lining of this nest was partially composed of bits of stick picked up outside the tea-factory under one of the windows of which the nest was built.

The eggs number two to four and are like those of the preceding bird.

Fifty eggs average 17.4×12.5 mm. : maxima 19.5×13.6 and 19.0×14.2 mm. ; minima 15.7×12.0 mm.

Both birds take part in building the nest and in incubation. Several observers have also noticed that these Swallows, like the Common Swallow, return again and again to the same nesting site, either repairing the old nest, if necessary, or merely removing the old, and putting in fresh, lining.

Hirundo smithii Leach.

THE WIRE-TAILED SWALLOW.

(1157) *Hirundo smithii flifera* Stephens.

THE INDIAN WIRE-TAILED SWALLOW.

Hirundo smithii flifera, Fauna B. I., Birds, 2nd ed. vol. iii, p. 245.

The Wire-tailed Swallow has a very wide range, being found from the Lower Himalayas South to Mysore and North Travancore.

It does not occur in the very wet districts of Eastern Bengal and Assam but is resident in Burma from Arakan, where Hopwood found it breeding, to Tenasserim, and again in Eastern Burma from the Shan States to the same district.

It is resident wherever found except in Northern Sind and in some of the hottest and driest parts of Rajputana, to which it seems to be an irregular visitor only, though in Southern Sind and in Rajputana, where there is a constant water-supply, it breeds regularly and is to be found all the year round.

It is not gregarious, but occasionally two or three nests may be found under the same bridge or built against the same rock, and Hume says that "three to seven nests will often be found quite near to one another" where there is plenty of water. Hume sums up the kind of site selected for building as follows:—"They breed almost exclusively in the immediate neighbourhood of water, under the cornices of bridges, under culverts beneath which some little pool remains, under overhanging shelves of rock or kunkar, projecting from the faces of stoney or earthy river-cliffs, and in cells of buildings overlooking the water."

Occasionally they make their nests inside buildings which are not over water. Thus Jones obtained one nest in the Patiala State, at about 6,000 feet elevation, attached to a rafter in a deserted shed. Adams in Sambhur obtained a nest in an old rest-house, the mud being brought from a well 200 yards distant. He also once took a nest with four eggs from the wall of a well.

The nest is the usual half-cup of pellets of mud, but is generally deep, much deeper in proportion than the nests of the Nilgiri House-Swallow. As a rule the nests measure roughly about 4 inches wide, or rather more, by nearly 4 inches deep, sometimes, when they are cone-shaped, even 5 inches. Shallow nests are, however, sometimes constructed. Adam describes one, which was built in "one of the small cells in the wall facing the river in the Etma-doudoula Gardens" at Agra, as a broad shallow half-saucer "about $5\frac{1}{2}$ inches broad and about 3 inches from front to back." The bottom of this nest "was about $\frac{3}{4}$ inch and the sides $\frac{1}{2}$ inch thick. The cavity was lined with fine grass-roots and a very few feathers."

As a rule the lining is either all feathers or is mixed with just a few grass-stems.

In the hills the Wire-tailed Swallows breed from May to the end of July and seldom have more than one brood. In the plains they breed principally in February, March and April, and again in July, August and September. In Peshawar Skinner found them breeding in April and May, whilst in Trimulgherry Sparrow took eggs in October. Probably eggs may be taken at odd times in any month of the year, and Hume says he has seen eggs in every month except December.

The few eggs I have seen from Maymyo and Tenasserim in Burma were taken in April and May.

The eggs number three or four, most often the former, and in appearance can only be distinguished from those of the European Swallow by their size and on being, as a series, more richly marked. A good many eggs have a fairly definite zone of spots at the larger end, a rare character in the eggs of *Hirundo rustica*.

One hundred and twenty eggs average 18.4×13.1 mm. : maxima 20.0×13.0 and 19.1×13.8 mm. ; minima 16.1×12.9 and 17.0×11.6 mm.

Both sexes take part in building the nest and both share in incubation, which is said to last fourteen days.

(1158) *Hirundo fluviicola* Jéndon.

THE INDIAN CLIFF-SWALLOW.

Hirundo fluviicola, Fauna B. I., Birds, 2nd ed. vol. iii, p. 246.

The Cliff-Swallow is found over the greater part of India from Kashmir and the Outer Himalayas to Coimbatore on the South and East to Sikkim and Etawah. It does not occur in Sind.

So well was this little Swallow known in Hume's time and so well did he and his correspondents record its breeding that very little can be added to the accounts given in 'Nests and Eggs.' Did space allow I would like to quote all Hume says, but the following includes the gist of what he has to say :—

"The Indian Cliff-Swallow is one of the commonest of our Swallows, in Upper India at any rate. From the Tonse River near Mirzapur to the Sutlej near Ferozepur it abounds wherever there is water and cliffs or ruined buildings against which it can plaster its huge mud honeycomb-like congeries of nests. In the Doon under the Solana Aqueduct, in Ajmere, in Ahmedabad, in Guzerat, in Saugur, in the Central Provinces and twenty other places, I have noticed numerous colonies in and on buildings ; and as for breeding in cliffs, to give one single instance, visiting the River Chambal, where the Etawah and Gwalior road crosses it, and following its course downwards to its junction at Bhurrey with the Jumna, one will meet with at least a hundred colonies of this species, all with their clustered nests plastered against the faces of the high clay cliffs which overhang the river.

"They breed, according to my experience, from February to April and again in July and August. They build a small, more or less retort-shaped mud nest, in clusters of from 20 to 200, packed as closely as possible, so that a section parallel to the wall or cliff-face against which a colony has established itself, and about 4 inches away from the wall, would present an appearance much like that of a honey-comb, though the cells would be less regular. The

tubular mouths, from 2 to 5 inches long, all point outwards, but those of the exterior nests of the cluster are generally turned somewhat. The chambers vary a good deal in size, but average about 4 inches in diameter. Their nests are to be found equally in the wildest and most desolate, and again, as at the Kotwalee in Dehra and the city-gate in Ajmere, in the most thronged and frequented localities.

"The nests are well lined with feathers."

To this may be added the following sites :—"On the side wall of a Hindoo place of worship facing the main road of the city over one hundred nests" (Blewitt). "Nests placed under a wreck of an old bridge" (B. Aitken). "In great numbers under a railway arch over the standing waters of the Sholapur bank" (Davidson and Wenden). Bridges are a very favourite resort, and Betham writes me of such a site :—"This colony nested under a low bridge only just above the water, so that ingress and egress were not easy ; consequently all the birds flew in under the bridge on the upper side and left the bridge by the down-stream opening. I have found the lining to be sometimes of hair and grass together with feathers."

The size of the colonies varies greatly. Many are quite small, ten to thirty nests, others number one or two hundreds, and yet others are far bigger, for Aitken (B.) observed one of six hundred nests on the river at Akola, Berar.

Aitken (J.) remarks that these birds instead of carrying away the egg-shells, when the young are hatched, to a great distance as other birds do, merely drop them into the water, which does their duty for them.

Most colonies have two well-marked breeding seasons. The first of these is December to February and the second, after the rains have broken, in June, July and August. Both in Baroda and Poona Betham found them breeding during September and October, and possibly eggs may be taken in any month of the year, for in each colony some birds start laying much earlier and others much later than the main body.

The eggs number three or four in a clutch, generally three only.

They vary from pure unspotted white to white, rather smudgily spotted and blotched with very pale sepia or yellowish-brown, the blotches mostly confined to the larger end and often sparse even there. Occasionally the marks are a little deeper brown, better defined and more profuse, while even less often they form rings or caps at the larger end. As a series they are poorly coloured dingy eggs, and I have never seen one as boldly or darkly spotted as a normal egg of the Wire-tailed or Common Swallow.

One hundred and twenty eggs average 18.5×13.1 mm. : maxima 20.8×12.6 and 19.2×14.0 mm. ; minima 16.0×13.0 and 17.0×11.8 mm.

Both sexes incubate and both assist in the construction of the nest. Like most Swallows and Martins, the young return to the nest for the first two or three nights after they have begun to fly, the parents sleeping with them inside the nest.

Hirundo daurica.

THE STRIATED SWALLOW.

I would again draw the attention of collectors to the need for more specimens of Striated Swallows obtained off their nests. Winter specimens do not help to elucidate the many still unanswered questions about these birds.

Ticehurst has commented on the races of *H. daurica* at some length in the Journ. Bomb. Nat. Hist. Soc. (vol. xxxii, p. 349, 1927). In this review he lays stress on the great difficulty of defining the races and their breeding areas, but fails, as he says, to help in making these any more clear. The supposed *Hirundo d. japonica* he unfortunately compares with the far distant Himalayan bird, *nepalensis*, instead of with *daurica*, from which I find it difficult to separate it.

H. d. scullii, recorded as a breeding bird on Whistler's identification of some birds found breeding by him in Jhelum as being of this race, cannot be maintained in the present volume, as the specimens are all *nepalensis*. *Scullii* was apparently a winter bird shot in Nepal, which may or may not be a good race, but this cannot be discussed in this volume.

In the absence of any further discrimination between the races of *daurica* and of the areas occupied by them I adhere to my geographical distribution as given in the 'Fauna.'

(1159) *Hirundo daurica daurica* Linn.

THE DAURIAN STRIATED SWALLOW.

Hirundo daurica daurica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 248.

The breeding range of this Striated Swallow extends from Trans-Baikalia in Siberia, the Amur, Ussuri, Mongolia, Kansu and Tibet. If not distinguishable from *japonica* its range must be extended to Japan and Sakhalin. Within our limits it has only been known to breed in the hills of Assam, a possible extension from its range in South-East Tibet, but one which it is very difficult to understand. It is of course possible that the Shillong breeding bird may be *nepalensis*, but this would be almost equally remarkable. The birds caught on, or shot off, the nests from which my eggs were taken were identified in the Tring Museum.

In Shillong this Swallow is not seen until about the second or third week of July, when a few arrive and at once set about nest-

building in the office buildings and, more rarely, in the houses. The nest is exactly like that of the English House-Martin and is placed in similar positions. The only difference between the two is that *H. d. daurica* makes a projecting tubular entrance to its nest, 2 to 6 inches in length. This does not stick out as it does in the nests of the cliff-breeding Swallows, but runs along under the eaves or the beam to which the nest is attached. All the nests I have seen, with one exception, were built under the eaves of houses, and the birds undoubtedly preferred eaves constructed of smooth matchboard or other boarding to rough thatching or rough woodwork. In a few cases the nests were attached to the beams where they projected under the eaves, the nest being placed at the angle made by the beam with the wood of the eaves. A very favourite position was the extreme angle made where the two sides of a sloping roof met. The one exception referred to was built inside the house of one my clerks where two beams met at the apex of the roof.

The nests were made entirely of pellets of mud and lined with feathers. The mud was collected by the birds, both sexes, on the lake-side, and each visit to the lake enabled the bird to collect enough mud to deposit on the structure a number of the little granulations showing on the outside. The mud seemed to be ejected in little squirts, a little at a time, each squirt making one of the granulations, and the birds often took two or three minutes to eject and place all the mud in proper position. The birds worked early and late, but much less energetically between about 11 A.M. and 4 P.M., when they fed, rested and did just a little desultory nest building. Nests took about six days to make and one or two days to line with feathers and, before the tunnel entrance was completed, the hen-bird began to lay while her husband finished this off and then took up his share of incubation, which lasted fourteen days.

The young remained in the nest about twenty-one days before emerging and, for a couple of nights, at least, returned to it with their parents to sleep. By the end of the two days they seemed as strong on the wing as the old birds.

The breeding season is a short one and is restricted to July and August, and they never raise two broods—indeed, almost as soon as the young can fly they depart with their parents for the North.

In Siberia they are said to generally lay six eggs, but in Assam the normal clutch was four, occasionally five.

They are pure white, fine but not glossy in texture, and rather pointed ovals in shape, some being more blunt.

I have one egg, in a clutch of four, which has numerous small pale reddish freckles at the larger end, most of them in a broad ring.

Fifty eggs average 21.0×14.6 mm.: maxima 22.0×14.2 and 20.6×15.0 mm.; minima 16.4×13.6 and 17.3×13.1 mm.

(1160) *Hirundo daurica striolata* Temm. & Schl.

THE CHINESE STRIATED SWALLOW.

Hirundo daurica striolata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 240.

This, the largest and most boldly streaked of all the striated Swallows, is a common resident bird breeding in Central and South China, the Indo-Chinese countries and Burma, Java, Flores, Samba and Wetter Islands. In Assam it is an irregular Summer visitor and that only to the hills South of the Brahmapootra. In China it seems to move about locally, breeding in one area and wintering in another quite close by, while in other areas it is resident all the year round. In Java also it is a permanent breeding resident.

In Assam I found it breeding between 3,000 and 4,000 feet, making its nest in small colonies on steep cliff-sides but always under the shelter of some projecting rock or ledge. The nests were the usual mud retort-shaped nests of the genus lined thickly with feathers. In North Cachar the colony was a very scattered one of perhaps a dozen pairs. Many years ago I recorded :—"The place where I found them breeding is a lofty, very precipitous hill, overlooking the junction of the Jennam and Laisung streams. The South-East face consists of alternate tiers of perpendicular rock, from 5 to 50 feet high, and narrow ledges covered with grass and stunted jungle. Unfortunately I found the hill more than I could manage with one arm, and had to stop at a ledge below where most of the birds seemed to be congregated. Still there were a few Swallows about my ledge, and I could watch two pairs building only a few yards from me, while two other nests were also in sight. None of these nests were retort-shaped, all being mud semi-cups fastened against the surface of the rock and in each case well protected by a projecting piece of rock which overhung them. None of these four nests were completed, so I ordered my two Nagas on to the next ledge, from which they pointed out to me a nest which they said contained four eggs, and which was within their reach. On this I had a noose set and soon had one of the birds captured. The nest and its contents, together with the bird, were then brought down to me, but the mud part of the nest broke into pieces as it was being removed. The mud-work was very bulky and of considerable thickness, and it seemed to me to have been much larger than any nest of *H. rustica*. It contained an immense mass of feathers mixed with straw, completely hidden in which were the eggs, not four as first reported, but three only." The bird from this nest was sent to Dr. Hartert and identified by him as *H. striolata*.

The nests in the Khasia Hills were also all built on steep cliffs and were like those taken in North Cachar, but generally had tubular entrances.

In Burma this Swallow also breeds very commonly, but nearly always makes its nest under the eaves of temples or dwelling-houses,

several nests being often found in one building. These nests also always have retort-shaped entrances. Livesey informs me that the rightful owners are often driven away by *Micropus p. cooki* and their nests used as breeding places by that Swift.

In China Vaughan and Jones found these Swallows breeding in great numbers in the temples and houses, and they remark that while in some places they form the tubular entrances to their homes, in other places such entrances are never made and the nests themselves are often open cups, though always protected by the building above.

The breeding season in Assam was April and early May but, if the first nests were destroyed, the birds rebuilt them and laid again. Normally I think few birds laid after the third week in May and as soon as the young were ready to fly they all departed.

In China the season is later and longer, and in the Vaughan-Jones series there are eggs taken from the 4th May to the 4th July and, I am told, many birds begin to lay much earlier still.

The number of eggs laid is generally four, but often three only are incubated and, rarely, five may be laid.

They are white, but exceptionally an egg may be found with a few faint reddish specks on the larger end. The texture is fine and smooth and the eggs are fragile, but less so, I think, than those of the *rustica* group.

The eggs of Burmese, Javan and Assam birds are much bigger than those from China.

A series of forty eggs taken by Vaughan and Jones in China average 19.3×13.9 mm. : maxima 20.4×14.1 and 19.1×14.4 mm. ; minima 17.5×14.2 and 19.6×13.1 mm.

Thirty Indian eggs average 21.4×14.7 mm. : maxima 23.2×15.1 and 21.2×15.8 mm. ; minima 20.2×15.3 and 21.4×14.3 mm.

Javan eggs average as big as Indian and Burmese eggs.

(1161) *Hirundo daurica nepalensis* Hodgs.

THE HIMALAYAN STRIATED SWALLOW.

Hirundo daurica nepalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 250.

This is a Swallow which has been reported as occurring over the greater part of Eastern Asia, the great majority of the records referring to Winter birds. Of the others some seem divisible into yet further races (see also Ticehurst's notes in Journ. Bomb. Nat. Hist. Soc., *supra*). For the purpose of this work I include as its range only the Western Himalayas from the North-West boundaries of India to Assam North of the Brahmapootra, where it breeds over the greater part of the Outer Himalayas from 3,500 to 10,000 feet.

This Swallow breeds both in buildings and in cliffs and, sometimes, selects sites on the latter which are quite well wooded. As regards

buildings, Hume thinks it "constructs its nest by preference under the eaves and in the verandahs of empty houses and staging bungalows, which are seldom in the hills occupied for many successive days." Often, however, they make their nests in inhabited houses, placing them "beneath the eaves of houses, against window-frames, at the side of verandah beams," etc.

Magrath (*Journ. Bomb. Nat. Hist. Soc.* vol. xviii, p. 294, 1908) has a very interesting note on this bird's breeding at Thandiani:—"Hodgson's Striated Swallow breeds in small colonies about the bare hills below the forest. These Swallows do not appear to build their nests together like Martins, but a pair will build here and another there, sometimes widely apart when the rocks are unsuitable. The situation of nests, or rather remains of nests I saw, all appeared stupidly selected, being terribly exposed to wind and weather, and the nests had all collapsed. I found a pair building on 10th July on an old site on a face of a rock sloping inwards on the side of a road, where any passer-by could knock the nest down."

Sometimes, however, the nests are built in very inaccessible places, and Ratray tells me that though he obtained nests both near Murree and at Mussoorie which were easily get-at-able, others were built in quite impossible positions. Ratray also remarks on the scattered positions selected in most colonies of these Swallows.

Hutton has a most detailed account of the nest-building of this Swallow in Hume's 'Nests and Eggs.' I have never been able to corroborate what he says from my small experience of the nesting of the Striated Swallows, but it is to be hoped some of our North-West collectors will note what they may find to endorse or contradict what Hutton has written:—"When the bird has selected the spot on which it intends to build, it usually deposits a white chalky substance, by way of cement, against the wall or beam, as the case may be, as an adhesive foundation for the subsequent wall of mud. Without this precaution the weight of the material would cause it to part from its foundation. The same whitish earth may also be seen in the narrow neck of the nest, more especially at the mouth. Generally speaking this chalky cement is applied to any part that may appear to require strengthening. Sometimes if the neck is turned off at an angle there is pretty sure to be a layer of cement at the point of deviation from the previous direction."

The nest is just like that of all the Striated Swallows, with a tunnel-entrance said to measure anything from 2 to 6 inches, but sometimes being as much as 13 inches.

The breeding season is normally from June to August, but many birds lay in May, and Brooks found eggs nearly hatched in that month.

Most birds have two broods in the year and these are generally raised in the same nest. Hutton says of one pair which built their nest against a window of his house:—"They reared one brood in June and as soon as the young were able to fly they were escorted

by the old birds during the day and were initiated in the art of fly-catching, returning to the nest about sunset or earlier if the rain was heavy. This continued for about ten days, when the young disappeared, and the old ones laid again in the same nest towards the end of July."

The usual number of eggs laid is four, occasionally five or three.

They are of the same description as those of the other Striated Swallows.

Sixty eggs average 20.8×14.4 mm.: maxima 22.0×14.0 and 20.7×15.0 mm.; minima 19.1×13.6 mm.

(1162) *Hirundo daurica erythropygia* Sykes.

THE SOUTHERN STRIATED SWALLOW.

Hirundo daurica erythropygia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 251.

The breeding range of this Swallow extends from the foot-hills of the Himalayas to the Nilgiris in Southern India. To the East it is a common bird in the dry hilly districts of Western Bengal, and Osmaston has found it breeding in the North at Dehra Doon at an elevation of about 3,000 feet.

Ticehurst says that this race breeds at about 4,000 feet in the Himalayas in the same places as *nepalensis*, and rather infers that the two are different species. I can find no definite overlapping of the breeding range, but there is certainly an area between 2,000 and 4,000 feet in the sub-Himalayas where the birds grade into one another and some individuals might be placed with either race. This is of course what we should expect with subspecies of a species, which are generally and naturally hard to distinguish in the area where the two grade into one another. *Erythropygia* is the plains form always easy to distinguish; *nepalensis* the high-level bird above 4,000 feet, also easy to separate; while between plains and 4,000 feet we have the birds grading into one another. Thus in the Simla Hills Jones has found colonies breeding at 3,000 feet in the Bhagat States which are fairly distinct *erythropygia*, yet the birds breeding at 6,000–7,000 feet in the Bhogi State, Simla Hills, are equally easily referable to *nepalensis*.

One cannot improve upon Hume's and Blewitt's summary of the breeding of this Swallow. The former writes:—"Sykes's Striated Swallow breeds from April to August. Typically the nest, which is usually affixed to the under surface of some ledge of rock, or the roof of some cave or building, and which is constructed of fine pellets of mud or clay, consists of a narrow tubular passage, like a white-ant gallery on a large scale, say some 2 inches in diameter and from 4 to 10 inches in length, terminating in a hulk-like chamber from $4\frac{1}{2}$ to 7 inches in diameter externally. These nests have been aptly described as retort-shaped, but are not always of this shape. Indeed (though I am bound to say I do not agree with him)

Mr. F. R. Blewitt is disposed to believe that the long retort-shaped nests are commonly built as residences and the less-developed ones as breeding places. He says: 'Eccentric to a degree is this Swallow in the selection of a suitable place for its nest. I have obtained it on the ground, at the base of a rock, having for protection a small overhanging ledge; in a hole in any old wall; affixed to the roof-top of a pukka house; to the under ledge of a high rock; the arch of a culvert, bridge etc.; but never, though they may occur there, in mosques and pagodas; and twenty and thirty together, as stated in Jerdon. I have always found the nest single. The form and material of the nest depend mainly on the locality chosen for it. Sometimes a simple collection of feathers answers the purpose, at others it is more or less dome-shaped, the exterior of fine clay, the inside lined with feathers. The opening for egress and ingress is invariably made above the centre of the nest. Frequently I have seen the spherical or oval-shaped mud nest with the long neck or tubular entrance, but only once with eggs in it. From frequent observations I have sometimes fancied that it is intended more for a winter residence than for breeding purposes.' "

Culverts in roads seem to be their favourite resort, and many of my correspondents have written to this effect. Aitken is quoted by Hume as saying: "This is one of the birds which seem highly to appreciate the advantages of civilization, and to think, like Cowper's cat, that men take a great deal of trouble to please them. In Berar they have almost discarded the mosques which gave them their name, and have betaken themselves to the culverts of the roads."

In the Nilgiris and hills of Southern India the breeding season is April, May and June, but in Northern India, although many birds breed during these months, even in the hottest parts of Northern and Central India, many others do not commence to lay until the rains break in June.

The eggs number three to five.

Sixty eggs average 21.0×14.4 mm.; maxima 21.8×14.0 and 20.9×15.0 mm.; minima 17.8×13.9 and 18.5×12.9 mm.

(1164) *Hirundo daurica hyperythra* Layard.

THE CEYLON STRIATED SWALLOW.

Hirundo daurica hyperythra, Fauna B. I., Birds, 2nd ed. vol. iii, p. 253.

This Swallow is restricted to Ceylon, where it is found as a resident bird from the level of the Plains up to about 4,000 feet on the Uva plateau.

Although this is a common bird in many parts of Ceylon, there is very little recorded about its nidification.

Wait ('Birds of Ceylon,' 2nd ed. p. 129) thus summarizes the information to the date of his writing:—"The breeding season is from April to June. The nest is a solid retort-shaped structure of mud, glued on to the under surface of a verandah roof, the arch

of a bridge, or culvert, or the roof of a rock-cave. The interior is lined with a felted layer of feathers. The two or three eggs are elongated ovals of pure white without any gloss. Two eggs in my collection measure $.95 \times .57$."

Phillips has obtained for me a small series of eggs taken from nests of the usual retort shape, one built "under an overhanging rock," a second "on the roof of an old fortification chamber in Fort Frederick," and the third attached to "the roof of a small rock-cave in a Tea-Garden." The nests were taken between 28th April and 10th May.

In the three nests the eggs numbered two, two and one respectively, but all were quite fresh, and more might have been laid.

Jenkins told me that he had seen these Swallows breeding in a railway tunnel and against the rock-faces of cuttings on the Kandy-Nuwara Eliya railway, but that he had never succeeded in getting eggs.

Seven eggs (including Wait's) average 21.3×14.3 mm.: maxima 24.1×14.5 mm. (Wait); minima 19.5×14.1 mm. Wait's two eggs are probably unusually large*.

Family MOTACILLIDÆ

(WAGTAILS and PIPITS).

Motacilla alba Linn.

THE WHITE WAGTAIL.

(1168) *Motacilla alba personata* Gould.

THE MASKED WAGTAIL.

Motacilla alba personata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 259.

This race of the White Wagtail breeds from Turkestan to the West of Lake Baikal, South to Gilgit, Kashmir, Ladak and Afghanistan and the ranges on the North-West Frontier of India.

The definition of the breeding limits of this Wagtail is rather difficult to fix, but there is no doubt that the areas occupied by *M. a. personata* and *M. alboides* overlap very widely and show that these two birds are specifically different.

The present bird breeds commonly on the North-West Frontier, where Whitehead took its nest at Bulta Kundi, in the Kurram Valley, while Fulton reported it as a common resident in Chitral between 8,000 and 12,000 feet. Whistler records it breeding at Kulu

* The birds breeding in the Kangra Valley first identified by Whistler as *H. r. rufula* and then, by Ticehurst as *T. r. scullii* eventually proved to be *H. r. nepalensis*, so the breeding recorded of this bird within our limits must be cancelled.

(Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 281); Fenton and Ward have taken its nests in Kashmir from 6,500 feet upwards, and Osmaston took one in Ladak, where the bird is rare, at 14,200 feet on the 2nd July. Finally, it probably breeds in and about Quetta at 6,000 feet.

Whitehead says that it breeds freely from Thull, 2,250 feet upwards, but the lowest elevation at which I have any other record of its breeding is 4,500 feet at Kulu (Whistler, *vide supra*), while it seems rare below 6,000 feet. Whitehead's own record of its breeding in the Kurram Valley was at 8,800 feet, and there were no eggs in his collection taken at lower levels.

Like most Wagtails of this group, the Masked Wagtails seem to prefer holes of some kind in which to place their nests, though these may be holes under stones in a river-bed or on hill-sides, or hollows among boulders, or roots on the banks of a stream, or a hole in an old wall, a heap of stones or a dead tree. Invariably, however, it is low down and never, even in trees, at any height from the ground. Fenton, who was one of the earliest collectors to find its nest in Kashmir, records rather a curious situation for it. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xix, p. 992, 1910):—“I found a pair of these birds building close to my tents at Aroo, in the Liddar Valley, Kashmir, elevation 9,000 feet. After watching the birds carrying away bits of grass etc., I discovered the newly-commenced nest in a Kalmaneh (*Viburnum falans*) bush about two feet above the ground, and 100 yards or so away from water. The bush was isolated, with open ground all round, and over and over again I saw the birds fly into it, while the building was in progress. The nest was a fairly deep cup built of grass-roots for a foundation, and thoroughly well padded inside with hair, wool and bits of cotton, etc., picked up round the camp.”

The nests are cup-shaped and, for a Wagtail's nest, not very bulky, and are generally well and compactly built. For the body of the nest grass and roots form the principal materials, but these are more or less mixed with odd dead leaves, bits of wool, hair and other scraps, some picked up with the grass and roots, while others are evidently purposely collected. The lining seems to be always of wool and hair or one of these only, perhaps just as they may be handy.

In Central Asia the breeding season seems to be May and early June, and I have eggs taken as early as the 27th April in Turkestan. In Afghanistan Wardlaw-Ramsay found them “breeding throughout May and June.” Whitehead and Fenton and Ward took nests from the 29th May to the end of June. The latest record given for eggs is the 2nd July by Osmaston for the nest already referred to.

The number of eggs laid is five or six, sometimes four only, whilst the nest found by Whistler contained five young birds and two addled eggs. The eggs are quite typical of all the races of the White Wagtail. The ground is white, rarely very faintly washed

with grey or, still more rarely, with brown or yellowish-grey. Most eggs are profusely, but finely, speckled all over with grey-brown, the specks being so small that the general appearance of the eggs is a pale grey. Occasionally the freckles are definitely more brown and darker. I have seen no eggs with large blotches, but in a few the freckles are larger than usual and are most numerous at the bigger end. I have one clutch in which the markings are slightly yellowish and blotchy.

Forty-five eggs average 20.1×15.2 mm.: maxima 21.2×15.5 and 20.2×16.1 mm.; minima 19.1×15.0 mm. and 19.3×14.1 mm.

Witherby gives the period of incubation of the eggs of the White Wagtail as twelve days, and says that both parents take part in the construction of the nest and in incubation. The same will probably be found to be the case with this subspecies.

(1171) *Motacilla alboloides* Hodgs.

THE INDIAN PIED WAGTAIL.

Motacilla lugubris alboloides, Fauna B. I., Birds, 2nd ed. vol. iii, p. 262.

Motacilla alboloides, ibid. vol. viii, p. 660.

Since volume viii of 'The Fauna' was written little has been done to elucidate the status of the White and Pied Wagtails, but what evidence has been forthcoming would seem to substantiate their claim to specific rank. I keep, therefore, to the nomenclature as given in that volume.

The breeding range of this species extends from Gilgit through Kashmir, Kumaon, Garhwal, Ladak and Sikkim to Tibet. In Kashmir it is a common breeding bird between 6,000 and 10,000 feet; Osmaston found it nesting at 12,000 feet near Tankse in Ladak, and it is common in parts of West and South Tibet up to 13,000 feet and possibly higher.

In all its habits this bird is a very typical Pied Wagtail, making a nest very like that of our European bird and placing it in very similar situations. It is, however, less of a town or village bird, keeping far more during the breeding season to rivers and streams. Its nest, like that of the White Wagtail, is nearly invariably placed in a hole of some sort, its favourite position undoubtedly being under a boulder or collection of drift on some island in the bed of a river. Davidson and others have remarked on the persistent way in which these birds build on these islands, though their nests are so constantly washed away whenever the rivers—as so often happens—rise temporarily with the influx of melted snow. Other birds select safer places on the banks, in among boulders, while others again make use of holes in trees or place their nests in among their roots or, occasionally, tuck them away in tangles of bushes, creepers and briars. Very rarely they will make their nests under the eaves, or in a hole in the wall of a deserted house

or shepherds' hut, while, still more rarely, they have been known to select sites in inhabited buildings.

The nest is a cup, often very bulky in proportion to the size of the bird. Normally it is made of grass, roots, leaves, more or less mixed with a variety of oddments such as scraps of wool, twigs, hair, bracken etc., but the lining is nearly always of wool, wool and hair, or the latter only. Davidson says that nearly all the nests he found in Kashmir were made almost entirely of brown sheeps' wool, and were lined with hair. Nests sent me from Tibet have always had a considerable amount of wool and hair in the outer parts of the nest, while the lining has generally been of yaks' hair.

Outwardly the nest is very roughly shaped, conforming to that of the hollow in which it is placed, and in consequence may be anything from 6 to 10 inches in diameter and about 3 to 4 in depth. The chamber for the eggs is always neat, warm and beautifully finished off, measuring roughly about 3 inches in diameter by $1\frac{1}{2}$ or less in depth.

The breeding season lasts from the middle of May to the end of July, while Ward found five fresh eggs in a nest on the 3rd August, which he sent to me. A few birds may have two broods in the year, but I do not think they are normally double-brooded.

The eggs number four or five, occasionally six, Buchanau taking two nests containing this number of eggs near Pakgaon in Kashmir.

In appearance the eggs are like those of the White Wagtail, but as a series are more dull, browner and, perhaps, more densely marked. The ground is white, always tinged to some extent with grey, the markings consisting of innumerable specks of brownish-grey. The depth and tone of colour varies to a slight degree, but I have seen no eggs with a really white ground and comparatively bold speckling of dark brown, such as seems to occur among the eggs of the races of White Wagtail.

Eighty eggs average 21.3×15.5 mm.: maxima 22.5×16.0 and 22.0×16.5 mm.; minima 19.3×14.6 and 21.2×14.2 mm.

Both birds assist in building the nest, but I have no information as to the period of incubation or whether both sexes take a share in it.

(1172) *Motacilla maderaspatensis* Gmelin.

THE LARGE PIED WAGTAIL.

Motacilla lugubris maderaspatensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 263.

Motacilla maderaspatensis, ibid. vol. viii, p. 660.

This fine Wagtail is found over practically the whole of India, from Ceylon to an elevation of at least 4,000 feet in the Himalayas, and from Bomhay and the Punjab in the West to Western Bengal and Bihar in the East. It does not appear to breed in Sind, unless casually, nor does it occur in the East as far as Eastern Bengal, though it breeds quite commonly in Bihar.

This is one of our Indian birds which was as well known in Hume's time as it is now. It is a most familiar little bird and seems to seek rather than avoid humanity. There is little one can add to Hume's summary of its breeding habits. He writes:—"They always nest in the neighbourhood of water, but, with this sole reservation, they place their nests almost anywhere. These may be found in holes in banks, crevices in rocks, under stones, under clods of earth, amongst the timber of bridges, in drains, holes in walls, on roofs, and in fact anywhere except on shrubs or bushes. The nests are always down on something solid, and that is about all that can be said.

"In the middle of the River Jumna, at Agra, there is an iron buoy attached to the pontoon bridge, which is surmounted by an iron ring, and in this ring for successive seasons a pair of Pied Wagtails nested, within 5 yards of the roadway and in full view of the thousands of passengers who daily cross the bridge. In the Chumbal, a little above its junction with the Jumna, a pair built in the clumsy old-ferry boat which was but seldom used, and when the female was sitting she allowed herself to be ferried backwards and forwards, the male all the while sitting on the gunwale singing, making from time to time short jerky flights over the water and returning fearlessly to his post.

"In this latter case the nest was nothing but one of those small circular ring-pads, say 4 inches in external diameter, and an inch thick at the circumference, which the women place on their heads to enable them to carry steadily their round-bottomed earthen water-vessels; a dozen tiny soft blades of grass had been laid across the central hole, and on these, of course bending them down to the surface of the massive boat-knee on which the pad had accidentally been left lying, the eggs were laid.

"The character and materials of the nest are quite as various as are the situations in which it is placed; as to character it varies from nothing (for they will lay in a tiny depression on the bare earth) up to a neat well-formed saucer or cup; as to the materials, nothing tolerably soft seems to come amiss to them; fine twigs, grass-roots, wool, feathers, horse-, cow- and human hair; string, coir, rags, and all kinds of vegetable fibres seem to be indifferently used."

Among other curious places recorded by other collectors as sites for the nest may be noted the following:—

"In the Saharunpore District on the flat roofs of the canal chokies, or in the small ventilating holes in the wall" (G. F. L. Marshall).

"At Fettegurrh their favourite place seems to be the bridge of boats. The nest is usually built inside a 'pigeon-hole' either at the stern or bow of a boat" (A. Anderson).

Many nests have been reported as having been built in holes in walls of wells, sometimes at considerable depths.

In Poona E. Aitken "found a nest on the 17th April on one of the barrels of the boat-club floats." This was in the late 'sixties of

1800, and curiously enough on the 4th April, 1923, Mr. T. R. O'Donnell also took a nest of this Pied Wagtail "on a barrel of the raft at the boat-club in Poona."

Betham, it should be added, found them breeding at Poona in more normal situations, "building solid compact nests, usually well concealed, under boulders and stones in the small islands which abound in the river."

As regards the size of the nest, all that can be said is that in most cases the inner cup is a neat, fairly well finished-off structure some 3 to 4 inches in diameter and from 1 to $1\frac{1}{2}$ inch in depth. The outer dimensions may be anything. Mr. D. F. S. McArthur sent me one clutch of eggs of which the nest was "a pile of dead leaves, possibly wind-blown, a couple of feet across, with a depression at the top lined with wool and hair"; on the other hand it may be, as Hume has said, not measurable or non-existent.

The normal breeding season is March, April and May, but a few birds also breed in February and June, while in September Betham found fresh eggs at Poona and Butler took a nest at Abou. Carter, writing from the banks of the Cauvery, informed Hume that he had taken eggs in December and January.

Four is the number of eggs commonly laid, three occasionally and five very rarely.

In shape they are broad ovals, sometimes a little compressed at the smaller end, but seldom really pointed.

They are of the White and Pied Wagtail type but as a series run very dark and rather brown, while an occasional clutch may be definitely of this colour. The ground is a pale grey, a few clutches having this tinged with buff or green, and the numerous markings are tiny blotches rather than stippling, the eggs seldom, if ever, appearing unicoloured. The markings, also, are generally more numerous at the larger end, where they occasionally form rings or caps.

One hundred eggs average 21.9×16.2 mm. : maxima 23.9×16.5 and 23.1×17.3 mm. ; minima 20.4×15.9 and 22.3×15.1 mm.

The texture is, as usual, glossless.

Both birds help in building the nest, but the female alone carries on incubation, the male generally keeping close to the nest and often sitting on some prominent stone or other perch close to it.

(1173) *Motacilla leucopsis* Gould.

THE WHITE-FACED WAGTAIL.

Motacilla lugubris leucopsis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 264.

Motacilla leucopsis, ibid. vol. viii, p. 660.

This Wagtail is said to breed over the East of Siberia, Amur to Mongolia and Northern China, South to Tibet. Vaughan and Jones describe it as breeding freely in South-Eastern China and,

finally, Hopwood has recorded it as breeding in Burma. This latter is the only record of its breeding within the limits of our work. One of the eggs was forwarded to me by Hopwood with the following note :—

“ This nest was made of grass and was placed under some débris on a sand-bank. Mr. Raikes described the bird as exactly like an English Pied Wagtail. It contained four fresh eggs on the 13.3.1914, of which he took two and broke one. I myself saw the nest about ten days later on a sand-bank in the Upper Chindwin, where it is still in the plains. The nest was then empty, but a pair of *Motacilla leucopsis* were still inhabiting the sand-bank.”

The egg sent me is just a common type of egg of the Pied or White Wagtail and measures 21.3×15.0 mm. It is just like many others of *leucopsis* sent me by Messrs. Vaughan and Jones.

In Tibet Bailey took a nest with five eggs at Nonda, 13,500 feet, while I have had two nests with birds sent me from Gyantse Plain, about 12,000–13,000 feet.

Motacilla cinerea Tunstall.

THE GREY WAGTAIL.

(1174) *Motacilla cinerea caspia* (Gmelin).

THE EASTERN GREY WAGTAIL.

Motacilla cinerea caspia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 265.

Our Eastern form of the Grey Wagtail breeds from the Urals East to Kamschatka and South to the Safed Koh and the Himalayas.

Whitehead says it breeds freely in the Kurram Valley between 6,000 and 8,000 feet (Ibis, 1909, p. 240), while Harington obtained a nest at Bulta Kundi at 9,000 feet; in Kashmir its nest has been taken at heights varying from 6,000 to 10,000 feet; Whympers took them in Garhwal up to 10,000 feet, and Osmaston (B. B.) records (Ibis, 1925, p. 700) it as “generally distributed in Ladakh in suitable localities by running water up to about 13,000 feet, but nowhere very numerous. They are not uncommon in and above Leh, 11,000 feet to 12,500 feet.”

This little Wagtail seems nearly always to make its nest either in islands or banks of running streams or close by the same, and seldom, if ever, in banks or other places by lakes or other stagnant water. Above all other places it prefers islands in the centre of quickly flowing rivers and streams which have ample boulders and stones under which it can secrete its home, while sometimes it makes use of holes in the banks of the stream or among boulders at its edge.

Occasionally the nest is built in what, for Wagtails, are rather curious positions. Brooks says that one nest he "found in Cashmere was placed in a small bush on an island in the Sind River, about 5 feet above the ground. The situation was that of a Finch's nest."

Whymper, who took many nests on the Bhagirathi River, found nearly all under boulders, logs or piles of drift; one, however, "was concealed in a small tuft of grass." Osmaston, again, obtained a nest "built in a bundle of thorns which had been placed on the top of a wall."

The nest is a small edition of the White Wagtail's nest but more compact, neat and shapely. In Kashmir Davidson found most nests to be constructed like small nests of *M. hodgsoni* "but smaller, and the wool composing them was in all cases white" and not brown, as in the nests of the larger bird. In nearly every nest recorded the outer material used has been grass, generally grass only, but in one nest seen by Rattray mixed with dry roots. The lining is always of hair and wool, sometimes mixed and sometimes one of these used singly. The dimensions of the inner cup are roughly $2\frac{1}{2}$ inches in diameter by 1 or less deep.

The breeding season is May and June, but a few birds breed in April and July; possibly the latter are second nests. Whymper's earliest and latest eggs were taken on the 27th April and 20th July respectively, and I have seen none taken later or earlier than these.

The number of eggs laid in the Himalayas is four or five, very rarely six, while in its more Northern breeding range six seems to be the normal clutch.

The ground-colour is white more or less faintly tinged with grey or pale stone-colour or, very rarely, creamy-buff. The marking consists of a dense stippling of pale grey, pale reddish-brown or, rarely, pale brownish-grey. In many eggs the stippling is so fine and so evenly distributed over the whole surface that the eggs appear to be a pale uniform grey, in others the stipplings are slightly larger and show up from the ground, while in a few clutches they assume the appearance of mottling, often more conspicuous at the larger end. One beautiful clutch taken by Whymper at Harsil in Garhwal has the eggs almost unmarked except for caps of deep grey at the big end. A few eggs have one or two blackish lines at the larger end, never of any length or thickness.

In shape the eggs are generally short, blunt ovals.

One hundred eggs average 19.0×14.2 mm. : maxima 20.6×13.7 and 18.5×15.8 mm. ; minima 17.0×13.0 and 17.1×12.9 mm.

As usual with Wagtails, the male takes no part in incubation, but he does his share of nest-building and is an attentive husband and good father.

Motacilla flava Linn.

THE BLUE-HEADED WAGTAIL.

(1175) **Motacilla flava beema** Sykes.

THE INDIAN BLUE-HEADED WAGTAIL.

Motacilla flava beema, Fauna B. I., Birds, 2nd ed. vol. iii, p. 267.

The Indian or Eastern race of *Motacilla flava* breeds, according to Sushkin, in extreme South-East Russia. In West Siberia it breeds as far East as the Yenesei, where it meets the Far Eastern form *taivana*. It probably breeds at suitable elevations and places over most of West Central Asia, and has been recorded as breeding both in Kashmir and Ladak.

Ward notes of this bird: "Breeds in parts of Ladak. I have not found the eggs in Kashmir proper, but it is said to breed there."

So far as I know its breeding in Kashmir has never been confirmed, but Ward sent me four eggs and a bird shot off them collected by Crump near Chusal in Ladak at "about 12,000 feet." The bird, which was shot on the 18th June, was sent to me for identification, and is now in Col. Ward's collection. The nest, which contained four eggs, was described as "a small compact cup of grass and roots, lined with wool and wedged in among the roots of coarse tussocky grass in a wide open plain on the borders of a lake."

The eggs, which could not be separated from those of the preceding bird, are also just like a series of *M. f. beema* in my collection secured from Tibet and elsewhere.

Forty eggs average 19.5×14.8 mm.: maxima 20.7×15.0 and 20.6×15.6 mm.; minima 18.2×15.0 and 19.1×14.1 mm.

Motacilla citreola Pall.

THE YELLOW-HEADED WAGTAIL.

(1182) **Motacilla citreola calcarata** Hodgs.

THE INDIAN YELLOW-HEADED WAGTAIL.

Motacilla citreola calcarata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 274.

The Indian Yellow-headed Wagtail breeds within our limits from the North-West Frontier to Garhwal and Ladak, and is very common in certain parts of Kashmir. In this State it breeds at much lower elevations than over most of its range. Betham one year (1917) found it very common round Srinagar, breeding abundantly in many of the marshes and surrounding grassland. So numerous indeed were these birds that one morning, without specially searching for them, he found three nests, containing four, four and five eggs respectively. Osmaston also says that he found

them breeding on the big swamps, e. g., the Hokra Jhil, in the Kashmir Valley, at 5,200 feet. In the Khagan and Kurram Valleys Whitehead found this bird "extraordinarily numerous, breeding between 8,800 and 13,000 feet wherever there was suitable country." In Ladak Osmaston and Ludlow obtained them nesting between 10,000 and 14,000 feet, and sometimes up to 15,000 feet.

Nests and nesting sites are very much like those of the Grey Wagtails. They are invariably built on open land, sometimes in swamps and marshes and sometimes in open pasture or grassland. Wherever placed, however, they are always very well hidden, tucked away in some natural hollow at the foot of a little bush or, more often still, in among the roots of thick soft grass. In Gyantse Steen, Kennedy and my other numerous correspondents obtained most nests in grass of this nature, but nests were also found in broken-down reed-beds, under tussocks of grass or bushes on the banks of streams and, often, in rank grass at the edge of irrigation ditches. In the N.W. Frontier hills Whitehead and Harington found them breeding in most cases on the banks of streams, the nests being concealed in hollows in rank grass or under bushes. All correspondents agree in considering the nests very hard to find, concealment being very complete. When, however, one knows the kind of place in which to search for them, or sees the cock bird hovering around, one has only to continue hunting until the female leaves at one's feet, for they are very close sitters.

The nest is quite typical of those of the Grey Wagtails, a neat cup of grass and roots thickly lined with wool or hair, or with both. One or two of the nests found by Whitehead were lined with white goats' hair, the lining showing up against the darker grass walls of the nest. The cavity for the eggs varies from 2 to 2½ inches across by under 1 inch in depth, while externally they fit into the hollow in which they are built and may be anything from 4 to 7 inches in diameter.

The breeding season is chiefly June and the first half of July, but in the lower elevations, as in the Kashmir Valley, they commence laying in the middle of May. They do not appear normally to be double-brooded.

Both males and females breed in immature plumage, the females perhaps more often than the males. Whitehead, Osmaston, Ward and many others have commented on this, and Osmaston considers that more breeding females are in immature plumage than in adult dress.

The number of eggs laid is four or five, occasionally three only, but I have never seen more than five.

In appearance the eggs are like those of the European Grey-headed Wagtail but less definitely freckled or spotted and, of course, much bigger. As a series they look very unicoloured pale grey faintly tinged with olive or, in one or two, with brown or yellowish stone-colour. The ground is the faintest of greys with

innumerable almost indistinguishable specks and stippling of darker grey, grey-brown or olive-grey, or, exceptionally, sienna-grey. I have seen only one clutch in which the markings are sufficiently more numerous at the larger end to justify calling them capped, and I have only seen three or four eggs marked with the short hair-lines sometimes seen in the eggs of this group.

In shape the eggs are broad to moderate ovals, occasionally rather longer and pointed. The texture is rather fine and some eggs are faintly glossy.

Eighty eggs average 20.7×15.0 mm. : maxima 22.2×15.4 and 20.6×16.0 mm. ; minima 18.5×14.5 and 20.5×14.0 mm.

Both birds assist in building the nest and the cock bird also incubates, though not for such long hours as the female. White-head on several occasions shot the male off the nest, both these and the females he obtained being now in the British Museum (Natural History).

(1183) *Dendronanthus indicus* (Gmelin).

THE FOREST WAGTAIL.

Dendronanthus indicus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 276.

This curious species is said to breed in Eastern Siberia, and it has been found nesting in Eastern and Northern China and the Northern hills of Burma and Assam.

During the breeding season it is entirely a bird of deep evergreen forest at altitudes of 5,000 feet upwards, rarely descending to 4,000 feet. The only nests I have seen have been built by stream-sides, in open glades or by forest tracks made by larger game and, when nesting, the birds haunt such places as far inside the forest as possible. They never seem to breed on the outskirts and it is only in the cold weather they leave the depths of it.

The only records of its nest having been found within our limits are my own finds in North Cachar. My first eggs were brought to me by Nagas together with one of the birds noosed on the nest and the nest itself. Both eggs and nests were, however, so utterly un-Wagtail like that I could not believe they were genuine, although my Nagas never deceived me.

I visited the place where the nest was found, and was fortunate enough to find the pair to the noosed bird and shoot it, and later I found a nest myself exactly like that given me by the Nagas.

All the nests I have seen have been built on horizontal boughs of small trees, these branches being between 2 and 4 inches in diameter and between 4 and 10 feet from the ground. One was built on a sapling growing among boulders on the banks of the Laisung stream, a second on a small tree beside a well-used deer and bison track in high forest, and a third in a tall straggly bush growing at the side of a beautiful glade in the same place. In no

case was the nest in any way concealed but, at the same time, it assimilated so well with its surroundings and was so small that it could only be detected with difficulty when the bird left it. A description of the one first found suffices for all, as they were all exactly alike except in the lining. The nest on the tree by the Laisung stream was built on a thin horizontal branch overhanging the boulders and the Laisung itself, here a tiny stream a few yards across. Overhead was a green canopy of branches which kept everything in deep shade, but below, near the stream, boulders and rocks covered the ground and undergrowth was scanty, consisting principally of flowering *Caladiums* and *Jasmins*. Working through this I noticed a Wagtail-like bird flit down to the stream from a tree about 10 feet from me and, looking up, noticed what looked like a knob on the branch of the tree, of the same green colour and covered with the same lichen as the branch itself. A closer examination showed it to be a most beautiful little nest which looked as if made entirely of moss, coated and smoothed over with cobwebs. When pulled to pieces it proved to contain many tiny scraps of soft twigs, leaves, fine grass and roots, all most compactly matted together with shredded moss and cobwebs. Outside it was decorated with numerous scraps of lichen similar to that growing on the branch. The lining in this nest was of hair, possibly fungoid mycelæ so like hair that I could not distinguish it. This was the only point in which the nest differed from those found later, which were lined with tiny bright red moss-roots or with serow- and mithna-hair.

On first seeing the nest I thought it must be one of the Yellow-bellied Fantail-Flycatchers' and not that of the bird I had noticed. We accordingly retired, to sit down some yards away and watch, but, while our backs were still turned, the bird returned and settled on the nest. Putting her off we set nooses on the nest and again retired, and within five minutes the female was caught. So tiny was the nest in proportion to the bird that the four eggs it contained seemed far too large for it and, if the nest had surprised us greatly, the eggs did still more, for they were to all intents and purposes Chaffinch's of quite a common type.

In China La Touche took nests and eggs exactly like those described above. Vaughan and Jones also obtained nests and eggs, and again the nests were said to be the same small neat cups built on horizontal boughs of small trees in heavy forest.

In North Cachar my nests were all taken in May, the earliest on the 7th of that month. In China, however, June seems to be the breeding month, and La Touche took one on the 2nd July. This one, now in my collection, measures externally $2\frac{3}{4} \times 1\frac{1}{2}$ inches, with an egg-cavity $1\frac{1}{2}$ inch in diameter by nearly 1 inch deep. This nest may, however, have been slightly compressed in packing and travelling, and the dimensions are, I think, slightly smaller than those of the nests found by me.

The full clutch of eggs numbers four and, as I have already said, these can be exactly matched by many eggs of Chaffinches. The ground in most is a grey with a distinct lilac tinge, while the marking consists of large, though few, primary blotches of purple-brown, with the edges looking as if they had run, and rather more numerous smaller secondary blotches of grey and neutral tint. One clutch taken by Commander Jones differs from all the others. The ground is a very pale grey and the spots, both primary and secondary, are much smaller and are more numerous, especially at the larger end. A single egg taken by Jones is of the same Chaffinch character as those taken by La Touche and myself.

In shape the eggs are broad ovals, the texture not very fine and the surface only very faintly glossed.

Thirteen eggs average 19.1×13.9 mm.: maxima 20.9×15.1 and 18.0×15.8 mm.; minima 17.4×15.3 and 19.0×14.7 mm.

Anthus trivialis (Linn.).

THE TREE-PIPIT.

(1185) *Anthus trivialis haringtoni* Witherby.

THE HIMALAYAN TREE-PIPIT.

Anthus trivialis haringtoni, Fauna B. I., Birds, 2nd ed. vol. iii, p. 280.

The Himalayan, or Witherby's, Pipit breeds from Turkestan to the North-West Frontier of India, Gilgit, Kashmir and Garhwal.

Numerous nests of this bird were obtained by Whitehead and, later, by Harington from the Khagan and Kurram Valleys between 5,000 and 11,000 feet. Osmaston obtained it in Tehri Garhwal at 11,000 feet, Buchanan at Vishnu Sar at about 9,000 feet, while Ludlow also got nests in the Tekkes Valley in the Tianshan.

The nest is nearly always situated in open country, the birds preferring wide stretches of grass-covered hill-side; they do, however, also breed on slopes for the most part covered with stones and boulders, but with little patches of grass and a few scattered bushes. Occasionally, also, they breed in mixed scrub and grass-land, selecting the more open spaces for their nests. In the Kurram Valley Whitehead took nests from the stony ravine near the rest-house of Gitta Das, the actual nests being built in tussocks of coarse grass on the banks. The nest itself is like that of the European Tree-Pipit, only often larger and more bulky. It is cup-shaped internally and is made of well interwoven and twisted grass, coarser on the exterior and finer in the lining. Sometimes the lining has other material mixed with the grass. Ludlow took one nest "composed of neatly twisted grass and lined with a few hairs." One nest only out of the many found by Whitehead and Harington was lined with hair, the rest with grass.

The normal breeding season seems to be from the first week of June up to the middle of July, a few birds laying in the last week of May.

Four or five eggs are laid, and these could not be distinguished from those of the European Tree-Pipit, though, as so few have as yet been taken, not nearly so wide a range of variation is shown.

Among those I have seen the following types are represented:—

Pinkish brick-red mottled and blotched with deep red and purple-brown, the blotches looking as if they had run and with more numerous secondary blotches of pale lavender.

Pale pinkish brick-red ground densely freckled with darker brick-red and with a long hair-line at the larger end of three of the five eggs in the clutch.

Pale stone ground freckled with sienna-brown, dense everywhere but more so at the larger end.

Similar, but the freckles a greyer brown and one or two hair-lines at the larger end.

Pale grey-brown densely freckled everywhere with dark, rather rich brown.

A rather purple-grey ground with very fine freckling of brown and with secondary freckles of lavender-grey dominating the general tone. This clutch has well-defined rings at the larger end.

In shape the eggs are broad ovals, while the texture is fine and fairly close, many eggs having a slight gloss.

Thirty eggs average 21.2×16.0 mm.; maxima 22.5×16.3 and 22.2×17.0 mm.; minima 19.6×15.1 and 19.8×14.9 mm.

***Anthus hodgsoni*.**

THE INDIAN TREE-PIPIT.

(1186) ***Anthus hodgsoni hodgsoni* Richmond.**

THE INDIAN TREE-PIPIT.

Anthus hodgsoni hodgsoni, Fauna B. I., Birds, 2nd ed. vol. iii, p. 281.

Our Indian Tree-Pipit breeds from the Afghan and Baluchistan frontiers and from Gilgit through Kashmir to Kumaon and Garhwal. None of my many correspondents in Tibet have ever found nests, but Wollaston obtained fledglings at Kama in September, and Whistler found it breeding in Lahul, while Osmaston found nests still further East in Sikkim. It breeds at all heights between 8,000 and 13,000 feet or even higher and, perhaps, often also at lower elevations.

Anderson, who was the first to take authentic eggs of this species, thus describes the kind of country in which it breeds:—

“I next encountered the same species in great abundance at Furkia, on the banks of the Pindar, close under the glacier, at an

elevation of 12,000 feet. My camp here was pitched on solid ice and it snowed heavily during the night.

"Here, with the snow lying deep on the ground, I found my second nest of *Anthus maculatus* (= *hodgsoni*).

"To sum up. *Anthus maculatus* affects by preference the more open grassy slopes in the immediate vicinity of woods, at elevations from 7,000 to 12,000 feet; these open glades in Northern Kuman are thinly covered with trees and overgrown with beautiful thick, soft velvety grass, about a foot high, with occasional tussocks, especially in the vicinity of sheep pens, sufficiently dense and high to afford cover to a hare."

In Sikkim Osmaston took nests in very similar country, "grassy hill-sides, thinly scattered with fir-trees and a few bushes."

The nests are placed in positions very similar to those chosen by other Pipits, but very often this species builds its nest under some overhanging boulder or rock, while at other times it hides it in hollows in banks, where it lies snugly screened by bushes, weeds or rank grass. In Garhwal, where Whymper found it very common, most nests were built in the grazing grounds, surrounded on all sides by forest. Here the nests were generally hidden in tufts of coarse grass left standing by the cattle, who fed on the softer, more luxuriant grass all round them.

Generally speaking the nest is the same grass-made cup built by other Pipits, the outer part of coarse grass, sometimes mixed with roots, a twig or two, and perhaps a few leaves at the base. Sometimes the nests are well made, stout and neatly lined with finer grass; sometimes they are mere flimsy saucers, the grass ill put together and with lining and walls all of the same material.

The first nest found by Anderson was different to any other I can find any record of—"a large massive structure of green moss, lined with fine grass-stems."

The breeding season is June, July and the latter half of May. The earliest and latest dates recorded are the 15th May and the 14th July.

The eggs number four almost invariably, but three only are occasionally laid and once Whymper found five in a nest.

They are quite typical in appearance but at once strike one as being exceptionally dark. Anderson speaks of finding "blackish eggs," and Whymper also notes that they are exceptionally dark in colour.

The red type of egg is quite exceptional and in my own series there are only two such, one taken by Buchanan in Kashmir and the other by a Russian collector. Whymper, who probably has seen ten times the number of nests seen by any other collector, never obtained a red clutch. Again blotched or marbled eggs, so frequent among those of the common Tree-Pipit, both in the red and grey type, are never found among those of the present species.

At least three out of four clutches give one the impression of blackish-grey or blackish-grey-brown eggs. Occasional clutches have a pale grey ground definitely blotched with dark grey-brown instead of being finely stippled all over.

In shape the eggs vary from very broad blunt ovals to moderately long ovals, slightly compressed at the smaller end. The texture is dull and glossless.

One hundred and twenty eggs average 21.4×15.8 mm.; maxima 23.3×16.0 and 22.1×17.0 mm.; minima 20.0×15.4 and 21.7×14.5 mm.

(1189) *Anthus nilghiriensis* Sharpe.

THE NILGIRI PIPIT.

Anthus nilghiriensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 283.

This Pipit seems to be confined to the Nilgiri and Palni Hills, where it breeds above 4,000 feet to the highest peaks, but more frequently above than under 6,000 feet.

Since Davison first found its nest and eggs in the vicinity of Ooty many other naturalists have also done so, the accounts of all these agreeing in every detail. I have received specimens from Cardew, Howard Campbell, Terry, Wilson, Packard, Williams and Betham, in many cases with notes on the nests and their sites. These notes may be summed up as follows:—

The Nilgiri Pipit breeds wherever there are wide open grass hill-sides, such as abound on the Nilgiri Hills. Here from about 6,000 feet up to the summits of the hills the Pipit is common, becoming less so on the lower hills and never, so far as has been yet recorded, descending in Summer below 4,000 feet. The nest is invariably placed well in the open and most often is built in among the roots of short grass either on the open hill-side or on some bank. Occasionally it is placed in a hollow where the bank or ground is steepest but, even then, it is always well screened from view by grass or weeds. Less often the nest is built at the foot of some bush, while, even more seldom, it may be hidden under a boulder or in a hole or crevice in a rock.

The nest is always the same, a cup of coarse grass and grass-blades lined with finer grass and fine grass-stems. The only variation from this has been a nest in which some fragments of bracken were used to make the outer walls.

In size, however, the nest varies considerably; most nests are rather bulky, solidly built cups, the walls thick and well put together and the inner cup deep. Such nests may measure as much as 6 inches in diameter and 3 in depth, with a cup fully 3 by $1\frac{1}{2}$ inches. Some nests, on the other hand, are flimsy, loosely put together saucers, occasionally little more than pads consisting of some loose grass thrown together to a thickness of half an inch or so.

Many birds commence to breed in April, and eggs may be found

all through May and June, while Cardew took fresh eggs as late as the 15th July.

The full clutch of eggs numbers two or three, the former more often than the latter. In appearance they are quite typical Pipits' eggs of the finely speckled grey or grey-brown type. Blotched eggs are, however, not rare, the blotches small but showing up well against the grey-white ground. I have one pair slightly olive-sienna, faintly freckled and blurred with darker sienna-grey. I have seen no erythristic eggs of this bird nor any eggs which one could call boldly blotched or marbled.

In shape the eggs are broad to moderate ovals, sometimes slightly pointed at the smaller end. The texture is fairly fine and the surface glossless or very nearly so. The shells are rather fragile.

Thirty eggs average 22.1×16.1 mm. : maxima 23.5×16.8 and 23.0×17.0 mm. ; minima 19.6×14.9 mm.

Anthus sordidus Rüp.

THE ROCK-PIPIT.

(1190) **Anthus sordidus similis** Jerdon.

THE RUFOUS ROCK-PIPIT.

Anthus sordidus similis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 283.

This Pipit inhabits the same geographical area as the preceding, being found in the Nilgiri and Palni Hills above 6,000 feet. Bourdillon also records it from Travancore, but the eggs sent to me thence by him are much too small to be those of this Pipit, unless abnormal, and are probably those of the Common Indian Pipit, *Anthus r. rufulus*.

Unlike the Nilgiri Pipit, this species frequents much more rocky, bare country. Howard Campbell says :—" These birds frequent the most rocky and bare of the higher hill-sides, and are never found on the wide grass slopes beloved by the Nilgiri Pipit. Moreover, whereas the latter bird is comparatively tame and confiding and so easy to track to its nest, the present one is very wild, will allow no close approach and, unless there are chicks or hard-set eggs, leaves its nest long before one comes close enough to it to make discovery easy. Nor does it build its nest in among the roots of grass, long or short, or in weeds, all those I have found being in holes of, or hollows under, rocks or boulders or well back in some crevice of the same. The nest is a pad or cup of grass fitting into the hollow in which it is built. The outer cup is shapeless, rather roughly put together and loose, but the inner cup, not more than 3 inches in diameter, is neat and of finer stems of grass."

Except that on rare occasions this Pipit does build its nest in among grass or weeds in some natural depression, there is nothing one can add to Howard Campbell's account.

The breeding season is April and May. Howard Campbell took all his eggs between the 2nd and 21st of April, but Miss Cockburn and Betham obtained nests and eggs in May.

The eggs number one to three, Howard Campbell having taken single eggs hard-set.

As a series they are much more distinctly blotched than are the eggs of most Pipits, and I have one quite handsomely blotched and another with an almost black cap at the larger end. In one pair of eggs the ground is a pinkish-grey, in all the others pale grey. In the pinkish pair there are marblings and blotches of reddish-brown, and in the other eggs the markings vary from specks to distinct blotches of dark reddish-brown, brown or purple-black. In no egg are the freckles small and numerous enough to make it look unicoloured.

In shape the eggs are broad ovals of typical Pipit texture and fragile for their size.

Ten eggs average 22.8×17.0 mm.: maxima 24.0×17.5 mm.; minima 21.6×16.0 mm.

Bourdillon's three supposed eggs of this species average only 19.2×14.5 mm.

(1191) *Anthus sordidus jerdoni* Finseh.

THE BROWN ROCK-PIPIT.

Anthus sordidus jerdoni, Fauna B. I., Birds, 2nd ed. vol. iii, p. 280.

The Brown Rock-Pipit breeds in the Himalayas at suitable elevations from Gilgit, throughout Kashmir, to Garhwal, Kuman, Sikkim and South-West Tibet, while Whistler records it as a breeding bird in the Salt Range.

Within the above area this Pipit may be found breeding at all elevations between 4,000 and 8,000 feet, and much lower down in the Salt Range. P. Mackinnon also obtained this bird's nests and eggs below Mussoorie at something under 4,000 feet, while Jesse had a clutch in his collection from near Abbottabad at about 3,000 feet.

This bird, like the preceding, is a dweller in the waste lands, preferring rocky slopes with but little vegetation of any kind but with plentiful loose rocks and boulders, under which to nest. At the same time, though it prefers to tuck its nest away in some hole or hollow under, or in, boulders and rocks, it occasionally makes it in a depression in the grass under the shelter of some small bush.

The nest differs in no way from that of the preceding bird, but is not always made of grass alone. Dodsworth (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 799, 1919) describes one nest as "a shallow cup, composed exteriorly of coarse grass-stems, roots, pieces of sticks, with some moss attached here and there to its sides, and lined with very fine grasses. It measured: diameter

of egg-cavity 3", depth of same 1.25"; external diameter 4.25"; thickness of sides .65"; thickness of bottom .5". It was placed in a hole under a tuft of grass."

Marshall gives the breeding season as "from May till middle of July," and this agrees with the notes of later collectors. In my own series I have eggs taken from the 28th April (Josse) to the 10th July (A. E. Jones).

The normal full clutch of eggs is three, rarely four, and sometimes only two. In appearance they are typical Rock-Pipits' eggs, but more handsome and more varied than those of the other races. In the series collected by Osmaston there are three clutches, which show well the extremes of variation:—

(1) Ground pale grey-brown richly blotched and speckled with dark brown, with secondary inconspicuous markings of lilac-grey and neutral tint.

(2) Ground very pale grey marked with small, rather longitudinal blotches of grey and brownish-grey, more numerous at the larger end than elsewhere.

(3) Ground pale sea-green, profusely spotted and blotched with blackish-brown, and with secondary spots of neutral tint. These are exceptionally handsome eggs.

Every intermediate form of egg to the above three may be found, the dominant tinge in a series being brown.

In shape and texture they are normal.

Forty eggs average 22.7×16.6 mm.: maxima 24.1×17.7 and 23.6×18.0 mm.; minima 21.0×16.3 and 22.5×15.1 mm.

(1192) *Anthus sordidus decaptus* Meinertz.

THE PERSIAN ROCK-PIBIT.

Anthus sordidus decaptus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 287.

This bird, described by Meinertzhagen, occurs in Afghanistan, Baluchistan and Sind. Betham and Williams both found it common in Quetta. Magrath obtained it nesting on the North-West Frontier at Khar, while at Kohat and Kurram Whitehead records that "it is a common resident in the district, nesting on the Samana in Summer."

Betham says that this Pipit breeds freely on the rocky bare hills around Quetta, where it builds a grass cup-nest either in tufts of dry burnt grass under bushes or in hollows under rocks, perhaps more often the latter. As a rule the nests are well concealed, but now and then one comes across one which is very conspicuous, being just inside some hollow not big enough to hold the complete nest or in which the latter is not far enough in to be entirely hidden. The nest, too, varies considerably, sometimes being a compact cup of grass well finished off, at other times a mere pad with a depression for the eggs.

At Khar Magrath took two eggs partially incubated on the 4th April, while Williams and Betham found eggs at all dates between the 19th April and the 17th July.

The eggs number two to four, the former number often being incubated, while once Betham took a clutch of five.

In colour the eggs are intermediate between those of the two preceding races. Less grey, more brown and slightly more boldly marked than the eggs of *Anthus s. similis*, but less brown and less boldly marked than those of *A. s. jerdoni*.

Thirty eggs average 23.3×16.6 mm.: maxima 25.0×17.2 and 24.9×17.4 mm.; minima 21.5×16.4 and 31.5×15.2 mm.

I can find no information in regard to incubation, how long it takes or which sex performs the duty, nor is there anything to show how or by whom the nest is built.

Anthus richardi Vieill.

THE SIBERIAN LONG-CLAWED, OR RICHARD'S, PIPIT.

(1194) *Anthus richardi thermophilus* * Jerdon.

THE DAURIAN, OR BLYTH'S, PIPIT.

Anthus richardi godlewskii, Fauna B. I., Birds, 2nd ed. vol. iii, p. 289.

Anthus richardi thermophilus, ibid. vol. viii, p. 661.

Stegmann, who says that this bird is a race of *campestris*, not of *richardi*, found it breeding in Transbaikalia, and it possibly breeds thence to Mongolia. It has been reported as breeding in the Shan States, and I have taken numerous nests and eggs in the Khasia Hills in Assam.

I found this Pipit breeding in considerable numbers on three of the highest ridges in the Khasia Hills, and nowhere else. The birds bred only between 5,600 and 6,200 feet, except on one occasion, when I took a nest, trapping both birds, at about 5,000 feet. For nesting purposes the Pipits almost invariably selected sites on the South side of the ridges, i. e., that most protected from wind and also having the most sun. The nests were built as a rule between fifty and a couple of feet from the top of the ridges, which were nowhere very steep and were covered with a dense, short, coarse grass varying from 4 to 10 inches high. The open spaces were anything from two or three hundred yards across and about the same in length, to one long stretch of nearly 3 miles

* This bird is now often accepted as being a race of *Anthus campestris*. Stegmann ('Birds of South-East Transbaikalia') says that both *Anthus r. richardi* and *Anthus campestris godlewskii* breed in the same area, and cannot, therefore, be the same species. I do not consider the matter yet solved. The Assam breeding birds are so very closely like typical *richardi* and not *campestris* that, at any rate for the present, I retain them as a race of *richardi*.

which averaged from half a mile to a mile across. The birds indifferently chose big or small areas in which to breed. Most nests were well away from the Pine-forests which surrounded all the open spaces, but rarely one might be found in among the bracken growing just outside the edge of the forest.

Nests were generally situated in among the roots of coarse grass where some of the tufts grew longer than usual. I do not know if the depressions were natural or not, but they gave one the impression that they had been, in part at any rate, made or improved by the birds. Sometimes a nest might be found under, or half under, some projecting ledge, root or stone, and a rather favourite site was just underneath the extreme top of the ridge, where it curled over, so to speak, forming a roof to the place in which the nest had been built.

I have often seen nests in hollows, or half hidden in holes in banks, but I have never seen one in a hole in a rock.

Most nests are very carefully concealed, but the birds sit close and the males often give away the position of the nest by their courtship display near the hen when she is sitting. The little cock, starting from some point of vantage such as a high boulder, top of a bank or some similar height, launches himself into the air, rising quickly and almost perpendicularly for about 50 feet, after which he spreads his wings stiff and wide, merely quivering the tips, and glides to the ground in a circular or zig-zag motion, his feathers, especially those of the rump, all puffed up and his tail widespread. This performance he will often carry out repeatedly, singing both while in the air and after he reaches the ground.

The breeding season is well defined, and all my eggs have been taken in May and June except a few, possibly second nests, in July.

I never found *Anthus r. rufulus* breeding on these high ridges, though the bird was exceedingly common on the lower hills and up to 5,000 feet.

A Pipit, which may be the present bird, is said to breed at 8,000 feet in the Naga Hills, where they have been deforested for cultivation and the abandoned cultivation has become wide stretches of grass-land.

The number of eggs laid is three or four, usually four, and I once took a clutch of five.

Normally the eggs are a pale grey or sienna-grey, with rather ill-defined blotching of grey-brown, sienna-brown or dark brown.

These markings are, as a rule, fairly well and thickly distributed over the whole surface, though the ground is never obliterated. In some eggs the blotches are reduced to freckles, but only extremely rarely do they become at all large or conspicuous. The clutch of five referred to above is very curious, and had I not found it myself and in a country where no Wagtail exists I should have taken them to be eggs of the latter bird. In colour they are a very pale French-grey marked faintly with darker grey. Another clutch

of four has the ground practically pure white speckled with blackish-brown and neutral tint and with a few large blotches of the former colour. Yet another has the ground practically white with dense blotches of deep red-brown at the larger end, forming a ring in one egg and caps in the two others.

Seventy eggs average 21.0×16.1 mm. : maxima 22.4×16.1 and 21.2×17.5 mm. ; minima 18.0×15.1 mm.

(1195) *Anthus richardi rufulus* Vieill.

THE INDIAN PIPIT.

Anthus richardi rufulus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 290.

This Pipit is found over the whole of India and Ceylon and all Burma as far South as, but not including, Tenasserim. Ceylon birds are small and rather dark, and with more material might possibly be divided from the Indian bird. Ticehurst thinks this form is nearer the Malayan than the Indian bird. Ticehurst also says it is fairly common in Southern Sind and that he has had specimens sent him from the North. It ascends the Western Himalayas to 6,000 feet, but in the Assam Hills seldom occurs much over 4,000 feet, though I have known odd pairs breed up to 5,000 feet.

The Indian Pipit breeds always in the open, but otherwise the situation varies greatly. Apparently my own experiences cover all that is to be said on this point, so that it is needless to quote others. I have personally taken nests in the following types of places :—

(1) In wide stretches of sun-grass land, where the grass was anything from 2 to 5 feet high, but in such places the birds always selected the lowest patches of grass, and preferred building their nests at the edges of these or beside tracks, both human and animal, running through them.

(2) Open country covered with short grass, scrub and, sometimes, with quite bare patches of ground, either muddy or stony.

(3) On the dividing banks of rice cultivation which are well covered with grass and weeds.

(4) On the grass verges of roads, main, medium or small.

(5) In cultivated tracts bearing low dry crops.

Nine nests out of ten will be found placed in among the roots of grass-tufts, large enough and tall enough to give them complete concealment. Generally a hollow, sometimes quite a deep one, is scratched out by the birds to receive the nest but, at other times, they are satisfied with placing their nests as low down in among the roots as possible without any prior scratching out. Other nests are placed in tangles of weeds and briars, at the foot of bushes or, less often, hidden or half hidden under logs, clods of earth or even under stones and rocks, though this is very exceptional.

They do not seek seclusion, and I have frequently seen the nest built within a few feet of where passers-by are continuous. One nest I saw was built by a main road and within 2 feet of stables holding ponies for a tonga service. The female was, in fact, disturbed from her nest by ill-mannered tonga ponies pushing the tonga almost on to it. Other nests I have seen beside footpaths constantly used by the villagers, who passed within inches of them.

The normal nest is a cup, generally fairly deep, made of grass, grass-roots and fibre, the inside neatly lined with fine stems of grass but never very thick. Rarely in the lining there may be placed a few horse- or cattle-hairs, though never in any great quantity. Sometimes, as in nests found in Ceylon by Phillips, most of the material consists of fine scraps of paddy-straw gleaned from the adjoining fields. In many nests fine grass-roots alone are used, these nests being generally very compact and well made. In others grass-blades predominate, and these are often rather loosely put together. Most nests measure somewhere between $3\frac{1}{2}$ and $4\frac{1}{2}$ inches across the upper diameter and are about 2 inches in external depth. The egg-cavity is about $2\frac{1}{2}$ inches in diameter and varies from less than $\frac{1}{2}$ inch to over $1\frac{1}{2}$. Some nests are protected by a canopy, which is raised up on either side of the nest or, more rarely, brought right overhead, the grasses bent into proper position but not interlaced. Occasionally this canopy seems to be the result more or less of accident, the grass being pushed into place as the birds construct their nests but, sometimes at all events, the canopy is obviously built by the birds. Building, as the birds do, often in very exposed positions, it is noticeable that the majority of nests are so placed that they get all the protection possible from wind and driving rain and also from the hottest sun. This is not so obvious where the nests are built in fairly thick cover, but is more so when the nests are built in scanty grass or under clods of earth in cultivated fields.

Some nests are approached by a tunnel in the grass, a characteristic of this bird referred to by Colonel Butler and one I have often seen myself. Sometimes in beaten-down grass the tunnel may be over a foot in length, while I have seen one nearly 2 feet long which led to a nest so completely enclosed that there were no other means by which the bird could have entered or left it.

The breeding season everywhere seems to be April, May and June, but a good many birds breed in the end of March and few others up to the end of July. Inglis has taken nests with eggs in September, but these are exceptional and were probably second broods, though, normally, I do not think the birds are double-brooded.

The eggs number three or four, very rarely five or two only. Up to 1906 I had a record of 300 nests containing eggs or chicks, and of these nearly 200 contained three eggs or young, four contained five eggs, two contained only two young and one two eggs and the rest held four.

The eggs vary greatly. The most common type has a pale grey or buff ground or, much more rarely, a pale greenish ground. The markings consist of fine primary speckles of blackish-brown with secondary ones of grey. In eggs with a buff ground the spots are generally browner and more blurred. In some eggs the markings are numerous everywhere, and in some more so at the larger end, where they may form indefinite caps.

I have seen only one clutch in which the markings are sufficiently blurred and numerous to give the impression of almost unicoloured eggs, and this one is so pale and grey that it is more like the eggs of the Grey Wagtails. Occasional clutches are very deeply and handsomely marked, and I have one which has a white ground with numerous big and small blotches of red-brown.

The typical shape is a broad oval, blunt at the smaller end, while some eggs tend to be moderate ovals and others to be exceptionally broad.

On hundred and twenty-five eggs average 20.2×15.4 mm.; maxima 21.8×15.1 and 19.9×16.4 mm.; minima 18.0×15.0 and 19.0×14.3 mm.

(1196) *Anthus richardi malayensis* Eyton.

THE MALAY PIPIT.

Anthus richardi malayensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 292.

Within our limits this Pipit breeds only in Tenasserim, but it is very common in Siam from Bangkok Southwards, extending through the Malay Peninsula to Lombok and Timor.

There are no accounts of this bird breeding within our limits, though it must do so. Herbert and Williamson found it breeding commonly in Southern Siam, and give the following account of its nidification:—

“The nest is situated in the middle of a paddy-field, or in any case well away from the banks which divide the fields. It is built in a cup-shaped hollow in the ground, and is generally under the cover of a root of growing grass, which gives it a fair amount of protection. The nest is made during the hot weather, so quite a lot of scratching and pecking is necessary to excavate the hole in the hard earth. Dry grass is the material mostly used for the construction, though roots and buffalo-hairs are occasionally employed for the lining. There is considerable variation in the extent of the nest, as it is sometimes quite thick, with a covering in the form of a partially domed top, though more often it is a scanty affair, and I have even found the eggs in a deep cup-shaped hollow with only a few odd pieces of grass on the sides. I have no notes to show when the nesting season commences, but nesting is in full swing early in May. It really finishes by the end of June, though a few odd nests may be found in July, and I have had a clutch of eggs as late as the 26th July.”

To this I may add that Williamson took a nest with three eggs on the 16th April.

The eggs, of which I have a magnificent series from Williamson and Herbert, cannot possibly be differentiated from those of our Indian bird, while the full clutch consists of three or four eggs, generally three.

One hundred eggs average 20.1×15.3 mm. : maxima 21.9×16.0 and 19.6×16.1 mm. ; minima 18.4×15.0 and 20.0×14.5 mm.

Eggs of the Philippine bird from the Wolfe collection are very pale, with well-defined rings at the larger end, and are also much bigger, twelve eggs averaging 21.2×16.3 mm. ; while they run up to 22.3 mm. in length and 17.0 mm. in breadth.

(1200) *Anthus roseatus* Hodgs.

THE VINOUS-BREASTED PIPIT.

Anthus roseatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 295.

Hodgson's Pipit, by which name this bird has hitherto been known, breeds from Afghanistan and Turkestan, throughout the Himalayas, to Kansu, Eastern Tibet, Yunnan and the Northern Shan States. In the Southern Himalayas it is common throughout Kumaon, Garhwal and the Simla States.

This Pipit has been recorded as breeding at 4,500 feet and, perhaps, may do so on very rare occasions in certain localities, but normally its breeding range is from 10,000 to 15,000 feet. The only note recorded of its breeding in Hume's 'Nests and Eggs' is that of Thompson's native-taken nest (probably quite correct) in Garhwal, and by Mandelli in the Dolaka district of Nepal. Even now, though its breeding habits are so well known, written records are rare and meagre. Whitehead (Ibis, 1909, p. 244) writes :— "This species nests freely on the Safed Koh from 11,000 to 13,000 feet. I found two nests in June, both under stones, perfectly concealed, and well and solidly constructed of roots and grass. In one case I surprised the bird excavating the hollow under a stone for its nest." Ward took its nest in the Liddar Valley at 10,000 feet. Whympers found numerous nests in Garhwal between 11,500 and 13,000 feet and, finally, Steen, Kennedy and others all found it breeding in some numbers in Tibet.

It is a rare breeding bird in Ladak but, according to Meinertzhagen (Ibis, 1927, p. 403) breeds in great numbers on the Deosai Plain, N.W. of Ladak, between 12,000 and 14,000 feet.

Whympers's notes on the series of eggs sent to me by him may be summed up as follows, and give a good description of its haunts and nest. He says :—"This bird is common in the Nila and other valleys in Garhwal above 11,000 and up to 13,000 or rather more. It keeps almost entirely to open hill-sides covered with grass and flowers, sometimes also dotted about with bushes, but is never found in the wooded portions. As a rule the nest is built in tussocks

of grass, placed on the ground in a depression among the roots, either a natural one or scratched out by the birds for their nest. Rarely I have found the nest under a rock or in a hollow in a bank where it can be hidden by the surrounding weeds and grass. The nest seems to be always a cup made of grass and lined with still finer grass."

A. E. Osmaaston found one nest lined with the coarse hair of the musk-deer.

Occasionally bracken, leaves and roots are worked into the nest with the grass and, rarely, the walls are raised and prolonged to form a canopy just like that sometimes made by the common Indian Pipit. The nests are larger than those of that bird and the inner cup averages about 3 inches across by 1 to $1\frac{1}{2}$ inch deep.

The birds breed late and the earliest eggs I have are a clutch of Whympers taken on the 6th of June, while the latest of which I have any record is the 13th July, taken in Tibet. The normal full clutch is four, but I have two fives taken by Whympers in Garhwal and one five from Gyantse. On the other hand, Ward found a c/3 well incubated.

In appearance the eggs are typical Pipits', but are, on the whole, dark and minutely speckled. I have one clutch of three of which the markings are so fine that the eggs appear to be a unicoloured olive-brown with a rather darker cap. Most eggs are either grey or brownish-buff in ground-colour, and are speckled in the first type with dark grey-brown and lavender and in the second with rich brown. Occasionally one gets clutches with a white or pale grey ground fairly boldly speckled and blotched with blackish-brown, the marks contrasting strongly with the ground. Between the darkest eggs and these latter every intermediate type may be found, though the darker greatly predominate. Rings or caps are generally present and in one clutch of pale yellow-grey eggs the markings are confined to dense confluent rings of almost black.

One hundred eggs average 22.0×15.6 mm. : maxima 24.1×15.8 and 21.3×16.4 mm. ; minima 19.5×14.6 and 20.7×14.4 mm.

(1204) *Oreocorys sylvanus* (Hodgs.).

THE UPLAND PIPIT.

Oreocorys sylvanus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 299.

The Upland Pipit is a common breeding species in the Outer Himalayas from Afghanistan and Kashmir to Garhwal at elevations between 4,000 and 8,000 feet. It has been recorded from Sikkim, but must be a rare bird there, as Stevens never met with it. From Sikkim Eastwards there is no record of its occurrence except in Yunnan, where it was obtained by Forrest on the Lichiang Range at 10,000 feet.

Dodsworth and Jones found this Pipit common in the Simla States between 5,000 and 7,000 feet, while Hume took eggs in the

same hills at 4,000 feet. Rattray, Buchanan and others found it equally common round Murree and the Galis, where Rattray took one nest at about 9,000 feet, exceptionally high. Mackinnon, on the other hand, obtained nests near Mussoorie below 4,000 feet, and Whitehead says it is resident and common in the Samana from 4,000 feet upwards.

This fine Pipit frequents open grass-land, sometimes such as is all covered by pasture, at other times, and perhaps in preference, sloping hillsides and uplands where much of the ground is rocky and bare. In Garhwal Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xxviii, p. 153, 1921) writes :—" This Pipit occurs in considerable numbers practically throughout the hills. Steep grassy slopes interspersed with bushes or broken up by rocky ground are its favourite haunts, and it is also common in open chir- (*Pinus longifolia*) forest where there is always abundance of grass."

In Simla Jones found its nest in the same kind of forest, open pine, but in most cases it breeds in quite open spaces, building its nest either under a stone or rock or in among the roots of a tuft of coarse grass.

The nest is a cup, often a mere pad, of coarse grass and grass-bents lined roughly with finer grasses. Occasionally the nest is fairly well made and the materials compact and well put together, but in most the grass is so loosely interwoven that it comes to pieces as soon as it is removed. It is always well concealed and, even if placed at the entrance to a hollow under a stone, it is always more or less protected by a tuft of grass or a few weeds.

The breeding-season is May and June, but Osmaston took a nest with eggs as early as the 13th April in Garhwal, while Jones in Simla and Rattray in Murree have also taken eggs in the first week in July. They are not, however, double-brooded.

The eggs number three to five and are just like those of *Anthus sordidus*. The ground is generally white to pale grey or, rarely, buffy stone-colour, and they are covered with numerous freckles and small blotches of grey-brown, reddish-brown or purple-brown, with underlying secondary blotches of grey. In a few eggs the markings are more numerous at the larger end and comparatively sparse elsewhere, but I have no eggs which show definite caps or zones, except one clutch of three which has a buff ground with rather large purplish blotches in a ring round the larger end.

In shape they are broad ovals, rarely rather longer and somewhat pointed; the texture coarse but fairly close, a few eggs having a faint gloss.

Thirty eggs average 22.6×17.5 mm.; maxima 24.0×17.2 and 22.3×18.2 mm.; minima 21.4×17.9 and 22.5×17.0 mm. A clutch of very small eggs taken by Jones, who flushed the bird off the nest, has one egg measuring only 20.2×15.0 mm., the other three being little bigger.

Family ALAUDIDÆ

(LARKS).

Alæmon alaudipes (Desf.).

THE DESERT LARK.

(1205) **Alæmon alaudipes doriæ** Salvad.

THE PERSIAN DESERT-LARK.

Alæmon alaudipes doriæ, Fauna B. I., Birds, 2nd ed. vol. iii, p. 304.

This big Lark is found from Mesopotamia, Persia, Afghanistan and Baluchistan to Sind and Cutch.

As Ticehurst writes (Ibis, 1923, p. 11):—This is “pre-eminently a desert bird, and is only found in the barest, most open plains, both sandy and stony, veritable howling wildernesses, or among the undulating sand-hills where a few straggling tamarisk tots, ‘lani’ (*Sueda*) or marram grass help temporarily to stay the drift. Everywhere where these conditions obtain this bird may be found, and is resident from the North Sind frontier to the Runn of Cutch, west to the Habb River and east to the E. Narra.”

J. C. Francis was the first person to obtain the nest of this bird in Sind and then Scrope Doig also found it breeding between the Narra and Hyderabad districts. Bell and Betham later found many nests, and the former in a letter to me gives a most interesting account of its nidification which amplifies that of Francis and Scrope Doig:—

“They are not rare about Karachi but are scattered over a vast extent of ground. They breed in the desert, where there are no trees and little vegetation beyond stunted tamarisk and *Sueda*-bushes with scattered tufts of withered grass. Here, if the male is watched for, the nest will soon be found, as he displays constantly in the breeding season and, within a very little distance of where he alights after his display, the nest will be found. Nor, when once one knows what to look for, is it in the least difficult to find. Scattered about over the plains and sand-hills are numerous little hillocks, each crowned by a scrubby bush or two, the basal half buried in the sand and the flat top mixed with wind-blown débris. Here the Desert-Lark builds his large untidy nest of grass, leaves and soft twigs on a basis of larger twigs, roots and drift. The lining is of finer grasses, roots and twigs mixed with a few feathers. The nest is generally placed on the shady side of the bush, but sometimes right in the middle on the top, where there is no shade at all. The bird has no real song, but before rising on his aerial display utters two loud whistling notes, then

three others in a lower key, and finally, as he flutters up into the air and descends again with widespread wings, he utters a continuous little tee-tee-tee, starting on the highest note and then continuing in a descending scale. Occasionally he utters this little attempt at a song when perched on a bush."

Francis says of the nest found by him that it "was large, placed in the sand, from outside twig to outside twig a foot across. It was composed of, first a layer of small branches, and then a deep circular cup, somewhat like an English Thrush's nest."

The breeding season is May and June, but a clutch of eggs taken by Buchanan near Dehra Ismail Khan was found on the 26th April, while one taken by Harington Bulkly's native collector, who shot the bird off the nest, contained three eggs on the 19th August. In Iraq Cox and Cheesman obtained this bird's nest and three eggs very hard set on the 5th June.

The eggs number two or three. The ground is white, very rarely tinged with cream or buff. Some eggs are minutely speckled with dark reddish-brown and with secondary pin-points of lavender, sparse everywhere except in a dense ring round the larger end. Other eggs have the marks larger and paler and less numerous but distributed as in the other eggs, only with the zone far less defined. They are the least heavily marked of all Larks' eggs found within the area treated in this work, this, with their large size, separating them from all others.

In shape they are long ovals, in no case very pointed. The texture is coarse and not very close, the surface glossless and the shells very fragile.

Thirty eggs average 23.7×17.2 mm.; maxima 25.9×17.6 and 25.6×18.3 mm.; minima 22.0×16.7 mm.

The female alone incubates, but there appears to be nothing on record as to which sex builds the nest.

Many nests are said to be destroyed in sandstorms, the nests and eggs being buried in the sand.

Otocoris alpestris (Linn.).

THE HORNED LARK.

(1207) *Otocoris alpestris longirostris* * Moore.

THE LONG-BILLED HORNED LARK.

Otocoris alpestris longirostris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 309.

The Long-billed Horned Lark extends from the Afghan and Baluchistan frontiers, through Kashmir, to Ladak, where it meets and merges into *O. a. elwesii*, the Tihetan race.

* Meinertzhagen has notes on the distribution of the races of *O. alpestris* in 'The Ibis,' 1927, pp. 399-402.

The Horned Larks are birds of very high elevations, breeding from 11,500 feet up to 15,000 feet or perhaps even higher.

Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, p. 194, 1926) describes the kind of country in which these birds breed. He found it common in the Dras and Suru Valleys in Ladak. Sanku and the country round, he says (p. 153), is "a village on an extensive flat above the Suru River with much cultivation, intersected by irrigation channels, waste land between fields being occupied by dense patches of the Ladakh thorn. There are also a good many Willow-trees." He then adds:—"The country round Suru is quite similar to that at Sanku. A joint colony of the Short-toed Lark and the Long-billed Horned Lark was discovered about 1,000 feet above the camp (10,600 feet). The type of locality which these birds select for breeding purposes is a gentle mountain slope covered with scattered *Artemisia* and *Trollius* plants. Nests are placed in the shelter of an often tiny plant of one of these species.

"There is the full complement of eggs, and not infrequently two only are laid."

Whitehead obtained a fine series of the nest and eggs of this Lark on the North-West Frontier, nearly all in the Khagan Valley, of which he gives an account in the Journal of the Bombay Nat. Hist. Soc. (vol. xxiii, p. 108, 1914):—

"It is not uncommon at the head of the Valley above 11,500 feet. The nest is merely a hollow scantily lined with grass and vegetable down. Nine nests in all were found with eggs. The full clutch is two and occasionally three. Whilst watching the first nest" [this contained two and a Cuckoo's egg] "the hen returned and at once set to work to remove the eggs by carefully rolling them down the slope with her bill. This also happened at another nest.

"This Lark is extremely hardy; by mid-June many clutches had already been hatched out even up at 13,000 feet when clear of snow. On June 26th, at the top of the Babusar Pass, at 13,580 feet, a blizzard-swept spot, we found a nest containing three young—two of these were dead, evidently killed by the blizzard which had been raging for twelve hours almost on end—the parents were still busily getting food for the survivor.

"Some 5 yards from another nest was found a single egg, but not one of the Lark's as it was smaller and nearly glossless. It must I think be a Cuckoo's (*C. canorus telephonus*), as this species was very common in these parts."

Later the egg was sent to me for inspection and proved to be the Cuckoo's, as expected.

From the above it is shown that the breeding season commences in the last week of May or first week in June and continues up to about the middle of July.

The number of eggs laid is two, rarely three. Buchanan found four in a nest he took at Gulmarg on the 23rd June, and these eggs seem quite typical, but the nest he describes as "a mere pad

of moss, feathers and hair, about 18", under a rock." In the same letter he says he saw both male and female quite close.

The eggs are in colour a very pale stone or yellowish-stone, very finely stippled with light reddish-brown, so fine that many eggs appear unicoloured, with a hazy ring round the larger end. In some eggs the markings are rather larger and more definite, with the ring better defined and, occasionally, the ground is pale grey with small dark grey or brownish-grey blotches scattered over the whole surface and with the usual denser ring at the larger end.

Twenty-two eggs, eliminating those from Ladak, which may be either *longirostris* or *elwesi*, from Kashmir Westwards average 24.9×17.1 mm. : maxima 26.2×17.7 and 24.2×18.0 mm. ; minima 23.5×16.5 and 24.1×16.1 mm.

The surface is finer and more glossy than in the eggs of the *Anthus* species and the texture much more close.

The shape is decidedly long oval but the smaller end very slightly compressed.

(1208) *Otocoris alpestris elwesi* Moore.

THE TIBETAN HORNED LARK.

Otocoris alpestris elwesi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 310.

The material obtained by Meinertzhagen, Ludlow and others shows that the range of this Horned Lark may be taken as East of the Tao Kar, Tso Moriri and Panjong Lakes in Ladak to Sikkim, Nepal and West and South Tibet.

This Horned Lark is extremely common on the hills above the Gyantse Plain, whence eggs were first sent to Dresser in 1905 by Capt. R. Steen. With the eggs was sent a note to the effect that the bird was a common one, laying three or four eggs in a flimsy nest of grass.

Since then I have had numerous eggs of this fine Lark sent me by Captain Steen and his numerous successors in Tibet. In many cases the eggs have been accompanied by nests and parent birds with plentiful notes. A summary of the notes, principally Steen's and Kennedy's, is the following:—This Horned Lark is very common on the hills above Gyantse from 13,000 feet upwards, but much less so in the Gyantse Plain where few birds breed. They keep to the bare stony hill-sides or desert plateau, where there is little vegetation beyond patches of dry burnt-up grass and a few odd bushes of a very thorny nature and some Tibetan furze. Here the birds breed from the middle of May to the end of July, building their nests on the ground in depressions under some small bush or a tuft of coarse grass. Generally they are fairly well concealed, but now and then one comes on a very conspicuous nest.

The nests which have been sent to me vary considerably. One was quite a good pad of goats' hair and feathers, mostly of

Sand-Grouse and Snow-Cock, with a few roots and pieces of coarse grass and with a good deal of soft vegetable down mixed with the other materials, as well as forming a lining inside. Another nest consisted of a little grass and roots, very loosely put together and lined with cotton-down. Most nests are like this latter in description, but I have been told that other nests are so small and ill-put together that they stand no handling at all and fall to pieces when removed.

The nest seems to be always placed in a hollow of some kind, often in a Yak's footprint, under shelter of some low scrubby bush or tuft of coarse grass. The birds are never found breeding in the cultivated areas.

The full complement of eggs varies from two to four, perhaps three more often than any other number and two more often than four. They are exactly like the eggs of the preceding bird, and individual eggs could not possibly be discriminated. As a series they are much more grey rather than yellow-stone, and they are less unicoloured and more distinctly blotched. I have one clutch of four which has a grey ground quite boldly, almost handsomely, speckled and blotched with dark grey-brown and reddish-brown. Another clutch of three appears to be unicoloured dark sienna-brown, with blackish-brown caps at the larger end.

As in the eggs of the Long-billed Horned Lark, most eggs show quite a definite zone of darker colour at the bigger end.

Eighty eggs average 23.9×16.6 mm.; maxima 25.1×17.3 and 25.0×17.5 mm.; minima 23.0×16.7 and 24.3×16.0 mm.

Among the birds said to have been shot off or trapped on the nest I have had two males sent me, so it is to be presumed that the male occasionally helps in incubation. Certainly both birds assist in making the nest, though the female seems to do most of the work.

(1209) *Melanocorypha maxima* Gould.

THE LONG-BILLED CALANDRA LARK.

Melanocorypha maxima, Fauna B. I., Birds, 2nd ed. vol. iii, p. 311.

This large Lark breeds from the Koko-Nur to Kansu, South to Tibet and Sikkim.

The only note recorded about its breeding within our limits or in Tibet, next door to us, is that of Ludlow (Ibis, 1928, p. 71):—"I have seen this bird both in winter and summer in suitable localities in the vicinity of upland lakes. They favour hillocky marshy land, covered with a stunted sedge-growth, and breed in such situations in June. The nest is a mere hollow on a hillock, lined with grass. The normal clutch is two or three. The eggs are very elongate and of a very dark brown colour. Five eggs average 29.3×18.5 mm."

In 1922 I arranged for some Tibetans to go to Hram-tso to get me a series of the eggs of *Larus brunneicephalus*, and these men

sent me a few other skins, nests and eggs. Among them was a skin, nest and two eggs of this Lark together with the following note from Mr. Macdonald, who arranged the expedition for me :— " The men said the eggs were laid in this nest under a clump of dead grass and furze on the mud shores of Hram-tso. The nest unfortunately broke to pieces when they lifted it up, but I put it in the box to show you. The skin has gone quite bad."

The nest consisted of less than a handful of dry grass. The skin was quite sufficient to enable me to determine it to be of this species. The two eggs are a very dark grey-brown, the ground grey with innumerable freckles and tiny blotches of grey-brown and reddish-brown, almost obliterating the whole surface. In shape they are long ovals, the texture is fine for the size of the egg and the surface faintly glossy. They measure 30.1×19.0 mm. and 29.0×19.0 , giving an average for the seven eggs of 29.23×18.64 mm.

The eggs sent me were said to have been taken on the 25th July at an elevation of about 14,000 feet.

*Alauda arvensis** Linn.

THE SKY-LARK.

(1211) *Alauda arvensis cinerascens* Ehmeke.

THE EASTERN SKY-LARK.

Alauda arvensis dulcivox, Fauna B. I., Birds, 2nd ed. vol. viii, p. 315.

Alauda arvensis cinerascens, *ibid.* vol. viii, p. 663.

The actual status of this Lark is very difficult to define, as additional races have been named from Central Asia. It appears, however, to be the form breeding in Western Siberia, Turkestan, Tianschan, Pamirs, Gilgit, Afghanistan and Baluchistan, occurring within our limits on the frontiers of the two last-mentioned countries.

I believe also that the Larks obtained by Whitehead and Harington in the Kurram Valley belong to the present race.

In his article on the " Birds of Kohat and Kurram " Whitehead only refers to the large form of Sky-Lark as a winter visitor, but later he found it breeding at 10,000 feet and told Harington, who also obtained a nest at Basal, Kurram Valley, 10,000 feet.

Fulton says it is resident about Chitral between 5,000 and 10,000 feet, and Marshall, Betham and Williams all say a large form of Sky-Lark is resident and breeds on the hills above Quetta.

* When writing the ' Fauna of India ' I came to the conclusion that it was advisable to separate the group into two species, a conclusion I see no reason to reconsider. On the other hand, *dulcivox* of Brooks, revived by Ticehurst, is preoccupied, as is *guttata* of the same author, and these must be changed to *cinerascens* of Ehmeke and *thamarum* of Meinertzhagen (*vide* vol. viii, *supra*).

Whitehead's and Harington's eggs, now in my collection, were taken on the 20th July and 30th June respectively, and each nest contained three eggs. Those taken by Whitehead are of the *Otocoris* type, long yellow-brown eggs almost unicoloured, but the female was shot off the nest, so there can be no mistake. The eggs taken by Harington are like typical English Sky-Larks, pale greenish-grey ground with profuse freckles of darker grey-brown, forming rings at the larger end.

They measure from 23.1×16.8 to 25.1×16.8 mm., too large to be the eggs of *A. g. thamarum* (= *guttata*), the only other Lark possibly breeding in the same area.

(1212) *Alauda arvensis inopinata* Bianchi.

THE TIBETAN SKY-LARK.

Alauda arvensis inopinata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 316.

The Tibetan Sky-Lark is found throughout Central, South and Eastern Tibet into the mountains of West and Central China.

Stevens did not observe any form of *arvensis* in Sikkim, but St. J. Hickley saw Larks breeding in open country North of Gnatong, though he unfortunately failed to obtain specimens. Sooner or later it is sure to be found breeding on the highlands near Tibet, so I include its nidification in this work. In Tibet in suitable places it is a very common bird.

Ludlow (Ibis, 1928, p. 72) writes:—"This bird is exceedingly common on the Gyantse Plain at all times of the year. It also occurs throughout the year at higher elevations provided there are fields and some attempt at cultivation. It does not inhabit waste lands.

"A few begin to soar towards the end of February, but it is not until April comes that this habit becomes general. Thence onwards right through the summer the whole Gyantse Valley rings with their song.

"The breeding season is a very protracted one, and I have taken eggs from early June till early September. Nests are always well concealed. Sometimes they are placed in the middle of barley-fields, sometimes amidst clumps of the beautiful Tibetan Iris (*Iris ensata*), and sometimes in long grass on the banks separating the fields. Clutches vary from three to four, more often the former."

Notes sent me with a long series of eggs from Tibet describe the nests as rather well-made cups of grass, fine roots and sometimes a few weed-stems, leaves etc. well lined with fine grass and placed on the ground in long grass, weeds or growing crops, generally the latter. Remains of nests sent to me agree with this description, in fact they seem to be just replicas of those of the English Sky-Lark.

The eggs, as Ludlow says, number three or four, but I have also a few fives, though such are exceptional.

In colour they are wonderfully constant. The ground is a pale grey, rarely tinged with fawn or buff, and they are freely freckled all over with rather grey-brown, the markings nearly always more numerous at the larger end, occasionally forming caps or zones. Underlying are secondary freckles of lavender, hardly visible without a glass. A few clutches are more brown or more purple in tint, and I have one with a greenish ground heavily blotched with greenish-brown.

The eggs sent me were taken between the 24th May and the 4th August.

Fifty eggs average 23.1×16.9 mm. : maxima 25.2×16.9 and 23.0×17.4 mm. ; minima 21.4×16.3 and 22.4×16.1 mm.

Alauda gulgula.

THE SMALL SKY-LARK.

(1215) *Alauda gulgula gulgula* Franklin.

THE INDIAN SMALL SKY-LARK.

Alauda gulgula gulgula, Fauna B. I., Birds, 2nd ed. vol. iii, p. 319.

The Indian Small Sky-Lark is found over the whole of tropical Northern India, Assam and Burma. In India its Southern limit may be taken roughly as a line from Khandeish on the West to Hyderabad in the Deccan and thence to Masulipatam. It is found in Sind wherever there is suitable cultivated country and it ascends the Himalayas to some height. In Kashmir it is common up to about 5,000 feet and occurs in Kuman at this elevation. On the North-West Frontier Whitehead found it to be a common Summer breeder, nesting freely on the grass-land up to some 2,000 feet or more. Harington also found it breeding at Peshawar.

This little Sky-Lark is just a miniature of our English Sky-Lark in its nidification. It haunts almost exclusively cultivated country or well-covered grass-lands, though occasionally it may breed in waste lands where there is little cover beyond a few bushes and some half-burnt grass. It builds often in grass by the sides of roads and village tracks, sometimes in grass growing on the banks of, or sand-banks in, rivers. Nests have also been found on golf-courses, boundary banks of rice-fields, in the scrub and grass on the sides of ravines and so on. The nest is nearly always well secreted and is usually placed in a small depression, which Hume says the birds scratch out for themselves. This hollow may be among the roots of grass, at the foot of some small bush or, though only rarely, under a clod in a ploughed field or half under some protecting stone on waste land.

The nest is, more often than not, a rather flimsy cup or saucer made of grass and lined with rather finer grass. Sometimes roots

are mixed with the grass, and Inglis says that most nests in Bihar are composed partly of these. Sometimes a few fine weed-stems are also used, and I have seen nests made entirely of rice-straw and only lined with grass. In such cases only short lengths of straw are employed, not long lengths which can be curled round. These are just laid criss-cross on the ground, filling up the base and sides of the hollow, while the lining is more carefully placed and better intertwined. Even so the whole falls to pieces on removal, as indeed do nearly all nests of this bird.

The breeding season is principally in April, May and June and, even in the hotter drier districts, the Sky-Larks do not wait until the rains break to breed. In the hills they keep pretty closely to the three months mentioned but, in the plains, eggs have been taken in March, and in Belgaum Butler took eggs both in April and in September and saw flying young in June, while Aitken (B.) obtained eggs at Akola in July and August.

The number of eggs laid is generally three, sometimes two only and very rarely four, while I have never seen more than this last number. Hume says: "Five is certainly the maximum number of eggs laid and three is the usual complement." Marshall also says that "five is the full number of eggs." All other collectors speak of only three, or even two, eggs forming a full clutch.

In appearance they are typical little Sky-Lark's eggs. The two extremes seem to be: (1) ground very pale cream or buff stippled freely all over with pale brick-red; (2) ground pale grey similarly marked with pale grey-brown; (3) deep dull buff ground almost obliterated by deep reddish-brown or brown freckles, small blotches and spots; (4) rather dark grey ground densely speckled with dark grey-brown. In all eggs the markings are more numerous at the larger end than elsewhere and, in the dark eggs especially, often form rings or caps.

In shape they vary from broad to moderate ovals; the texture is not very fine, but the shell has a fair, sometimes a high gloss.

Sixty-five eggs, including Hume's, average 20.6×15.3 mm.; maxima 23.0×17.0 mm.; minima 18.4×14.5 and 19.3×14.0 mm.

Both birds assist in the construction of the nest, and the male bird incubates regularly in the early mornings and evenings, while his wife feeds, though he does not allow her very long off.

(1214) *Alauda gulgula lhamarum* Meinertz.

THE KASHMIR SMALL SKY-LARK.

Alauda gulgula guttata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 318.

Alauda gulgula lhamarum, ibid. vol. viii, p. 663.

The Kashmir Small Sky-Lark breeds throughout Gilgit, Northern Kashmir and the higher ranges of Central Kashmir to Garhwal, Simla States and Kumaon.

The ordinary breeding elevation frequented by this Sky-Lark is 8,000 feet upwards. At Dras and Leh Osmaston found it breeding up to 11,600 and 10,300 feet respectively, and he also records it as very common between 9,000 and 12,000 feet in the Shyok and Indus Valleys in Ladakh.

Like its smaller plains relation, this bird also prefers cultivation and pasture land to any other kind of country, and chooses gently sloping hill-sides or wide rolling plateau-land rather than steep hill-sides and rocky bare ground. As regards the nest and its site, there is nothing can be said to differentiate it from those of other Sky-Larks.

The breeding season is from the middle of May to the middle of July, but a few birds breed both earlier and later. In Garhwal Whympers took several nests in the first week of May and others in the end of August. Probably many birds have two broods.

The eggs are typical Sky-Larks' eggs but, when seen in a series, at once strike one as being darker than those of any other. The ground-colour is most often a pale grey, the whole profusely covered with freckles or small blotches of grey-brown or brown or, rarely, of reddish-brown. In nearly every egg there is some indication, often well defined, of a cap or ring at the larger end. Unusual clutches in my series are (1) a very striking five taken by Whympers—these are olive-grey eggs with large caps, practically black, at the big ends; (2) a clutch of four taken by Osmaston with a pale stone ground covered equally all over with yellowish-brown, the surface highly glossed.

In shape the eggs are rather broad ovals, sometimes slightly pointed. The texture is much harder and closer than in the eggs of the plains birds and there is usually a decided gloss. It is very noticeable that many of the alleged eggs of this race taken at the lower elevations in Kashmir are very small, very fragile and much less close in texture, leading one to believe that they are the eggs of the plains race. Unusually small eggs taken at high elevations are glossy and hard in texture.

One hundred and forty eggs average 22.5×16.8 mm. : maxima 24.3×18.4 mm. ; minima 20.5×16.0 and 20.7×15.4 mm.

(1216) *Alauda gulgula australis* Brooks.

THE NILGIRI SMALL SKY-LARK.

Alauda gulgula australis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 320.

This race is confined to Southern India South of the imaginary line drawn from Khandeish to Masulipatam. It is also common in Ceylon. In Travancore Boudillon says that it occurs from the plains up to the tops of the highest hills in suitable open country, whether cultivated or grass-lands. In the Nilgiris, also, it ascends to the summits of the highest hills, breeding freely on the wide

grass slopes. In Ceylon Wait says that it is a resident in the drier portion of the plains but does breed in the wetter parts. He has found it breeding on the Uva patanas at 4,500 feet and I have seen the birds also at Newara Eliya. The nest is exactly like that of *A. g. gulgula* and is placed in similar positions but nearly always under the shelter of a tuft of grass or small bush, and seldom in cultivation. In Ceylon Wait says they also affect the sandy pasture-lands round the lagoons, nesting in depressions at the roots of the grass.

Bourdillon, in one of his notes to me, writes that they lay four to five eggs, but in a later note says three to four, and the former was probably a slip. Elsewhere everyone else has only found two or three eggs in a nest, and the only four I have seen was given to me by Bourdillon. In Ceylon two is the normal clutch, three exceptional.

In colour, shape and texture they are indistinguishable from those of the other races of Sky-Lark, and they go through the same variations but, as a series, they are distinctly pale, weakly-marked eggs.

Twenty eggs average 21.7×15.9 mm.: maxima 23.2×16.4 and 22.5×16.5 mm.; minima 19.5×14.3 and 20.1×14.2 mm. A larger series would probably give a smaller average size.

Miss Cockburn gives an interesting note on their breeding habits in the Nilgiris (Hume's 'Nests and Eggs,' vol. ii, p. 223):—"They build twice a year, sometimes beginning as early as February, and continuing till May. Then again from August to October, and even later as I have noted, having found a young Lark on the 2nd November.

"Sky-Larks never lay twice in the same nest, but always build a new one for every brood. I think an egg is laid every two days" (this is not correct: they lay an egg daily).

"Both parents share the pleasure of building, hatching and feeding the young. Even long after the latter leave the nest they are fed and watched by their parents and return at evening, for a week or so, to sleep in the nest."

Over most of their range the principal breeding months are March to May, but in Ceylon most eggs are laid from April to July.

(1217) *Alauda gulgula cœlix* Swinhoe.

THE CHINESE SMALL SKY-LARK.

Alauda gulgula cœlix, Fauna B. I., Birds, 2nd ed. vol. iii, p. 321.

This little Sky-Lark is found within our limits in the Shan States, extending thence into Yunnan and into Southern and Eastern China.

The only records of its breeding are those of Wickham and of Harington, the latter of whom obtained a nest and two eggs on

Mt. Victoria, a curious extension of its range West. This clutch, now in my possession, has a note with it to this effect:—"861a. *Alauda japonica*. Originally 3, one egg broken. Taken at 7,000 feet. Bird shot off the nest and identified by Oates at the B.M. as *Alauda japonica*." The skin, now in the British Museum, appears to be a quite typical *cælix*.

The other record is that of Wickham, who notes (Journ. Bomb. Nat. Hist. Soc. vol. xxxiv, p. 51, 1930) that he "took some nests at about 8,000 feet in the Chin Hills. The nests were typical Lark's nests taken in April, in each case a clutch of three only, rather long ovals, and one clutch has a very distinct ring of marking round the big end."

Vaughan and Jones found it breeding commonly in Shamshui, China, and note (Ibis, 1913, pp. 176-177):—"The nest is much like a Sky-Lark's, but perhaps a trifle more flimsy, and the eggs are laid as a rule in April; while, as the bird is double brooded, a second clutch is deposited in June or July. Fully fledged young have been seen as early as May 16th. The usual clutch is four, but five eggs were once obtained."

Fourteen eggs average 20.2×16.1 mm.; maxima 21.4×16.1 and 19.8×17.0 mm.; minima 19.2×15.9 and 20.0×16.2 mm.

They cannot be distinguished from the eggs of *Alauda g. gulgula*.

(1218) *Alauda gulgula herberti* Hartert.

THE SIAM SMALL SKY-LARK.

Alauda gulgula herberti, Fauna B. I., Birds, 2nd ed. vol. iii, p. 322.

This little Sky-Lark, which is very close to *A. g. sala* of Hainan, is resident in Cochin China, Siam and South-East Tenasserim. Specimens from Northern Tenasserim which Oates called *peguensis* seem nearer to our Indian *gulgula*.

As this bird is resident wherever it occurs it is sure to be found breeding in Burma later on.

Herbert gives the following description of its breeding in Siam (Journ. Nat. Hist. Soc. Siam, vol. vi, p. 216, 1923):—"This Sky-Lark is found in great numbers in the paddy-fields round Bangkok, and may be heard singing in the dry weather or early part of the rains.

"The nest is built in a cup-shaped hollow on the ground out in the open fields, and is very similar to that of the Pipit. It is usually placed under cover of a tuft of paddy-stubble, without any domed top, and is constructed of dry grass with occasionally a few roots or hairs for the lining. There are plenty of nests from early May to the end of June, though the commencement is earlier than this, and a fair number may be found in July.

"The eggs are broad ovals, much pointed towards one end, though long ovals are sometimes found. The ground-colour is

a yellowish-white, with streaky spots and specks of yellowish-brown, and sometimes a few pale purple spots. There is a zone or cap on the large end, often clearly defined, though sometimes it is of a cloudy nature."

A fine series of eggs taken by Herbert and Williamson agree with the above description, but there are also many eggs of the grey type so common to all our Indian Sky-Larks.

As a series the eggs are much better blotched and less freckled than any of the other races, and some eggs are really quite handsomely marked.

Fifty eggs average 20.5×16.0 : maxima 22.3×16.5 mm., minima 18.1×15.0 mm.

Calandrella acutirostris.

THE KARAKORUM SHORT-TOED LARK.

(1223) *Calandrella acutirostris acutirostris* Hume.

THE KARAKORUM SHORT-TOED LARK.

Calandrella acutirostris acutirostris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 327.

For the reasons given in the 'Fauna' I still retain two forms of this bird, although I admit that differentiation is often difficult and sometimes impossible.

As separated by me the breeding area of the present race may be defined as Karakorum, Western Kuen-lun, East Turkestan and Northern Kashmir to Ladak. Bianchi records it from the Sir Darya and Tianschan, while it also occurs in the Khorasan and Paraparmisiri districts of Persia. Betbam and Williams found it nesting freely round Quetta.

Osmaston's note on the breeding of this little Lark (Journ. Bomb. Nat. Hist. Soc. vol. xxxii, p. 130, 1927) is an excellent summary of what is known. He writes of it (under the name *C. a. tibetana*):—"This is an extremely common bird throughout Ladakh, being found almost everywhere from 10,500 to 16,000 feet, except on steep ground. They are also found in the Dras and Suru Valleys, where, however, they are not so common. They affect sandy plains and gentle hill-slopes dotted with stones and small rocks and with here and there scanty herbaceous vegetation. The song, emitted from the top of a stone or rock, is poor and monotonous.

"The nesting season commences in the end of May, and fresh eggs may be found throughout June and the first half of July. Nests occupy slight depressions in the ground scantily lined with a little dried grass and finished off with a dense warm lining of very fine vegetable down. They are placed in the shelter of a small stone or plant, more rarely quite exposed.

"Three eggs is the full clutch, but not infrequently two only are laid."

Ward and Whymper in 1906 obtained several nests at "Taubin," and Meruk in Ladak at about 11,000 feet. Nest, eggs etc. all agreed well with Osmaston's description.

The eggs are, of course, indistinguishable from those of the Common Short-toed Lark. The ground is a very pale rather yellowish-grey and they are faintly freckled with darker grey, the markings sparse everywhere but sometimes forming a denser ring at the larger end. Very rarely the freckles become definite blotches and are darker and more defined, but I have never seen boldly marked eggs. One clutch taken by Osmaston has a bluish-white ground with tiny specks of dark brown forming rings at the big end and very sparse elsewhere.

In shape the eggs are long ovals, generally slightly pointed at the smaller end. The texture is not very fine and there is little or no gloss, the shells being very fragile.

Sixty eggs measured by myself and including most of those referred to above average 21.1×14.7 mm., practically the same as given by Osmaston (21.0×14.6 mm.): maxima 23.0×14.0 and 22.0×15.6 mm. (B. B. O.); minima 19.4×15.1 mm. (B. B. O.) and 21.5×14.0 mm.

I have received eggs taken on the 2nd June and on the 22nd July, the earliest and latest dates I am aware of.

(1224) *Calandrella acutirostris tibetana* Brooks.

THE TIBET SHORT-TOED LARK.

Calandrella acutirostris tibetana, Fauna B. I., Birds, 2nd ed. vol. iii, p. 328.

I have little to add to the range of this bird as given in the 'Fauna.' Tibet from the extreme South, Yatung and Khamba Jong; West to Eastern Kuenlung, where it meets the preceding race; North to the Altyn Dag and Nan-schan; East to the Upper ranges of the Mekong, Blue and Yellow Rivers. It apparently also breeds in Northern Sikkim, as H. J. Hickley obtained specimens at 12,000 feet in July.

In Tibet this little bird swarms, and I have had series of its eggs sent me by various collectors.

Ludlow writes of this bird, under the name of *acutirostris*, as follows (Ibis, 1928, p. 73):—"This is a very common bird throughout Southern Tibet. It begins to arrive in Gyantse in early April. Soon after its arrival it commences to soar, but not in the same way as *inopinata*. Having attained a height of 200 feet or so, it begins a series of slanting Wagtail-like flights, hovering for a short time at the end of each flight, uttering a series of faint musical notes from time to time. This may continue for ten minutes; then, with a vertical dive, it descends to earth. Eggs are laid from May to July at all elevations between 13,000 and 16,000 feet. Practically all the nests I have found have been

in uncultivated areas, a favourite situation being dry stony river-beds. The bird seems very fond of constructing its nest under the shelter of a small leguminous herb (*Oxytropis sericopetala*). The nest is composed of dry grass sparsely lined with wool or the cottony growth of plants, and in it are deposited three, sometimes four, eggs."

Various correspondents from Tibet have sent me eggs taken at all elevations from just over 12,000 up to nearly 17,000 feet but, like true *acutirostris*, this bird also seems to prefer almost level ground to rough steep mountain-sides. All agree that it keeps away from cultivation, placing its nest under tufts of grass, weeds or small bushes. The bird is said often to scratch out a hollow for itself, but at other times to use a natural one or the foot-print of a yak. This it lines neatly with grass, sometimes thickly enough to form a substantial pad under the true lining of cotton-down and wool, which is neatly and compactly felted together. Outwardly the nest may be $3\frac{1}{2}$ to $4\frac{1}{2}$ inches, but the hollow is very shallow, usually about $\frac{1}{2}$ inch in the centre. They breed from May to August, many birds having two broods.

The earliest and latest dates I have recorded for eggs are the 14th May—in two years—and the 7th August.

The eggs are exactly like those of the typical race, and the average of one hundred is also exactly the same as for sixty of that bird, *i. e.*, 21.1×14.7 mm. : maxima 22.6×14.4 and 22.3×15.7 mm. ; minima 19.4×14.6 and 20.5×13.9 mm.

Both birds incubate, as both sexes have been caught on the nest ; both also help in building the nest and in feeding the young.

Alaudula raytal.

THE GANGES SAND-LARK.

(1225) *Alaudula raytal raytal* Blyth.

THE GANGES SAND-LARK.

Alaudula raytal raytal, Fauna B. I., Birds, 2nd ed. vol. iii, p. 329.

This little Sand-Lark is distributed over the whole of Northern India and Burma, from the North-West Provinces to Bengal and Assam and in Burma on the big rivers South to Thayetmyo. Barnes recorded it from Rajputana and Hume from the Nerbudda, but it is replaced in Sind and the rivers of the Punjab by the next race.

The Sand-Larks are essentially birds of the great rivers, keeping to those where they run between sandy banks and where they are not rapid running or with broken water. As Hume says : " A broad and tranquil stream, with wide banks of sand, is what it loves, and there, amid a few stunted, straggling shoots of tamarisk, it breeds and may be seen at all seasons."

On both the Brahmapootra and the Ganges, on which rivers I have known it best, it is only to be found above the mud-reaches

and below the rapid water. I never saw it much above Gowhaty in Assam, though the Brahmapootra is still a mighty river far above this, but the water is broken and rapid, and no longer flows in a silent, even if a swift, stream. On the Ganges it is found far nearer the delta, but in this river also as soon as the banks become mud it disappears.

It breeds both on the sandy banks of big and smaller rivers and on the islands of sand which begin to show in December or November and often become great stretches of sand and pebble by January and February. Much cover does not seem essential. I have seen them on sand-banks in the river which were quite submerged during the height of the rains and along the ridge of which grew a little *Equisetum*, a few coarse tufts of reedy grass or a small, rather dense bush of which I never learnt the name. As the island arises above the water a few more tufts of grass appear here and there lower down its slopes, and under the shelter of one of these the little Larks scratch out a tiny hollow about 3 inches in diameter, in which they place their nest. This, so far as I have seen, is little more than a pad of grass, very loosely and carelessly put together, which fills the hollow to the depth of about half an inch. There is no special lining and the eggs lie on the fine grass. Hume says the nest is sometimes made of grass and "dry tamarisk leaflets," and Cripps found nests in Faridpore made of grass "with a few feathers stuck about" them. This latter must, however, be very exceptional, for though I have seen nests in Faridpore and adjoining districts I have never found one like that described.

I have seen nests built in the open away from any shelter, and in late April have noticed the sitting bird gasping in the heat.

The breeding season is March and April, necessarily early, as the eggs have to be hatched and the young away before the rivers rise. Even as it is many nests, eggs and young get flooded out in the early rains. Both Inglis and Coltart have taken nests in Bihar in February, while on the Nerbudda the only nests ever found were taken on the 1st and 6th May. Occasionally birds have second broods, and in these cases they are built high up on sand-banks beyond the reach of any but an abnormal flood. Such nests have been taken by Coltart in July.

In Burma the eggs seem to be laid in February or, less often, in March, but I have very little information on this point.

The full clutch of eggs numbers two or three only, two quite as often as three.

The eggs are very like those of *Calandrella* but are darker and better marked, the spots being larger and less numerous. One clutch taken by Macdonald in Burma at Yesagyo has the ground pale buff and is well marked all over with small blotches of dull brown and lavender, leaving the ground quite visible. Another clutch taken by Inglis in Bihar has the ground pure white blotched, not very heavily, with brown and with secondary big clouds of lavender-grey.



ALAUDULA RAYAL ADAMSI.
The Indus Sand-Lark.
(Jhelam, 1906.)

Thirty eggs average 20.2×14.6 mm. : maxima 22.2×15.4 mm.; minima 18.0×13.9 mm.

Both sexes build the nest and both take part in incubation, and during the heat of the day, which is often very great in April, the two birds change duties at very short intervals.

(1226) *Alaudula raytal adamsi* Hume.

THE INDUS SAND-LARK.

Alaudula raytal adamsi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 331.

The Indus Sand-Lark is confined to Sind, the North-West Frontier Province and the Punjab as far West as the Jumna. Cock, who was the first to take the eggs of this Lark, found them breeding at Jhelum during April and May. Here also in 1900 and 1906 Rattray took many nests, but his were found prior to the 20th April, though at Dehra Ismail Khan he found fresh eggs up to the 25th May.

The nidification of this Sand-Lark differs in no way from that of the preceding bird, but a nest found by Col. A. E. Butler at Karachi deserves notice. He states that the nest was "very similar to, but rather smaller than, that of *Galerida cristata*, consisting of a hollow in the ground, lined substantially with dry grass, lumps of raw cotton, and a few horse-hairs, small pieces of rag, thread, and a few old feathers incorporated and often slightly banked round with thin pieces of hard incrustated earth." Pitman describes a rather similar nest found by him at Dera Ismail Khan, but all other descriptions sent me have been of small grass nests in natural or scratched-out hollows, generally under the protection of grass-tufts placed, as Cock observes, on the North or least sunny side.

The eggs, one to three in number, are just like those of the Ganges bird, and go through the same range of variation, but are a little smaller.

Forty eggs average 19.0×14.2 mm. : maxima 21.2×14.5 and 20.2×15.0 mm. ; minima 17.7×14.4 and 17.6×13.4 mm.

Mirafra cantillans.

THE SINGING BUSH-LARK.

(1229) *Mirafra cantillans cantillans* Jerdon.

THE BENGAL SINGING BUSH-LARK.

Mirafra cantillans cantillans, Fauna B. I., Birds, 2nd ed. vol. iii, p. 334.

This Singing Bush-Lark is found in suitable country in India from Sind, the North-West Provinces and the Punjab to Western Bengal and Bihar on the East. To the South it occurs as far as Travancore on the West and Madras on the East. In Sind Harington Bulkly found it a not uncommon breeding resident near Karachi, but

Ticehurst considers it to be a rare resident in that part of India. Whitehead found it "fairly numerous" at Kohat in Summer between 1,000 and 2,000 feet.

Although so common a bird, practically nothing has been recorded about its nidification since Hume's time, and I have been unable to extract any more information of special value from my numerous correspondents.

It is a bird of fairly well-watered tracts, and will not be found in the drier, more arid parts of Rajputana and the Deccan. It is very capricious in its selection of breeding sites, and Hume says:—"The bird has always been a puzzle to me. At distances of 50 miles or more apart you come upon small colonies, while in hundreds of intermediate and apparently exactly similar localities you never see it."

The nest, like that of all Larks, is placed on the ground, the site most often selected being one in plains of long grass. At other times it is built in short grass in pasture-land, rarely in growing crops, and rather more often in thin, open scrub-jungle. In all these situations the nest is well hidden and difficult to find, but Hume says that "at times in little frequented localities, such as the ravines of the Jumna on the South of the Cawnpore District; it will be found in a slight depression in the soil or niche in a bank quite open to view."

The nest varies greatly in construction. The majority are small cups, often mere shallow pads or saucers, of grass lined with the same and tucked well into the roots of the grass or of the protecting shrub or weeds, whatever these may be. It is always constructed of coarse and fine grass, being lined with the latter, and the only additional material ever used consists of a few grass-roots. Other nests are much more elaborate; the body of the nest is a comparatively deep cup, and over this is raised a dome made either of dried grass or of the grass actually surrounding the nest, which is bent over and, to a slight extent, interlaced. Often the surrounding grass is used and then added to so as to form a more compact canopy. Blewitt describes a nest taken by him in July near Hansie as "formed of fine grass, almost meeting above and with a hole in the side for ingress and egress and, though much smaller, reminding one of a *Munia's* nest."

Butler also took a nest near Deesa "almost spherical, with a hole near the top for ingress and egress, consisting of dry grass somewhat massively put together and neatly lined with similar material of a finer quality."

It has been suggested that these almost domed nests are only built during the rains for the sake of protection. I know little about this bird myself, but certainly all records of this kind of nest have been made of those found after the rains have broken, while those built in March and April have all been of the cup or pad type.

The breeding season is a long one, lasting from March to September,

the greater number of eggs being laid after the rains break in the middle of June. Many birds have two broods, but I have been unable to ascertain if in these instances the first nest is open and the second covered in.

The full complement of eggs laid is two to four. Hume, Blewitt and Butler all found four eggs in nests, though three more often, but my correspondents all speak of two or three as normal and four as exceptional. In appearance some eggs are just like those of *Calandrella*, while others are much darker. They range from eggs with a white ground, tinged with grey, green, yellow or buff, sparsely speckled or blotched with some shade of brown, to eggs which are so densely speckled all over as to appear uniform grey-brown, olive-brown or brown. Often there are indications of a zone at the larger end, but I have seen no capped eggs. In all eggs, if closely examined, secondary spots of lavender or grey may be seen, but these are never prominent.

In the 'Fauna' the measurements of the eggs, including those of Hume, were given. Now it is possible to give the measurements of forty eggs taken by myself, which are as follows:—

Average 20.1×15.4 mm.; maxima 22.9×15.6 mm.; minima 17.9×14.1 and 18.1×13.2 mm. As this small series contains two or three clutches almost abnormally small, a larger series would probably give larger measurements.

The nuptial display seems to be very similar to that of other *Mirafra*s and is described later on under *Mirafra assamica*.

***Mirafra javanica* Horsf.**

THE JAVAN SINGING BUSH-LARK.

(1230) *Mirafra javanica williamsoni* Stuart Baker.

THE SIAM SINGING BUSH-LARK.

Mirafra javanica williamsoni, Fauna B. I., Birds, 2nd ed. vol. iii, p. 336.

This race of Bush-Lark is restricted to Siam and to Tenasserim East of the Myawaddy, where it is sure to be found breeding later on.

Herbert and Williamson obtained a fine series of this Lark's nests and eggs around Bangkok and Samkok. The former writes (Journ. Nat. Hist. Soc. Siam, vol. vi, p. 217, 1923):—"This Bush-Lark is common in the paddy-fields around Bangkok.

"The nest is somewhat similar to that of the Pipit and the Sky-Lark, but as a rule it is better constructed and more protected above. It is placed in a cup-shaped hollow in the ground with growing grasses meeting over the top, and may well be described as a ball-shaped nest with entrance at the side near the top. It is built of dead grasses, and sometimes roots and hair are used for the lining. I cannot say when building starts, but nests are plentiful

during May and June and a few may be found up to the end of July.

The number of eggs laid in a clutch is three or four, and they are quite typical of the genus. The ground is nearly white, faintly tinged with grey, cream, buff or, very rarely, greenish. The markings vary from light grey, which is exceptional, to dark, almost blackish-brown, with underlying markings of lavender-grey which are quite inconspicuous. In character the markings are large freckles or small blotches distributed all over the egg but not thickly enough to obscure the ground. As a rule they are fairly evenly dispersed over the whole surface, but occasionally are denser at the larger end, without, however, forming caps or rings. A few eggs are quite handsomely blotched.

In shape they are regular ovals, the texture fine and the surface often glossy, especially in the darker eggs.

Fifty eggs average 19.7×14.6 mm.: maxima 20.7×15.0 and 20.6×15.3 mm.; minima 17.8×14.3 and 18.0×13.9 mm.

Mirafra assamica.

THE BENGAL BUSH-LARK.

(1231) ***Mirafra assamica assamica* McClell.**

THE BENGAL BUSH-LARK.

Mirafra assamica assamica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 337.

This Lark, which was described from Assam, almost its Eastern limit, extends on the West as far as the United Provinces and terai of Nepal and Sikkim. South it occurs in the Central Provinces and East it only extends to Manipur.

It is a bird of well-watered and well-wooded country and seems to prefer, above all other types of country, an admixture of cultivated fields and patches of grass, in the latter of which it breeds. It also breeds, however, in many other places. In Bihar the favourite site is the grass verge or bank of an indigo-field, or in the indigo crop itself. It may often be found placing its nest on the grass embankments of village roads or on the grass growing on the banks which divide the rice-fields. Sometimes it will nest in long "sun"-grass, 3 feet high, at other times it will hide its nest under clods or tufts of grass in fields which have been ploughed for Spring sowing. The nest is always placed on the ground in hollows, sometimes natural, sometimes scratched out by the birds or, often, in the footprint of a cow or some other animal.

The nest is typical of the genus and, indeed, of most Larks. Normally it is a cup, sometimes shallow and fragile, more often fairly deep, well built and compact, made of grass and grass-roots. The size varies considerably; most of those I have seen or taken were some 4 or 5 inches across externally and anything from $\frac{1}{2}$ to

2 inches deep. Hume says of one nest : " The largest and most perfect nest I ever saw was rather more than a hemisphere, the curved surface uppermost, 7 inches in diameter and 5 inches high, and with a neatly made circular aperture 2 inches in diameter nearly at the top. More roots had been used in this than is customary and these had been, especially internally, at the bottom."

This nest was of the second, or domed type, which is also often made by this Lark. Cripps describes one of these nests found by him in Faridpore as follows :—" The nest, the lower half of which rested in a small hollow, was a domed structure of 'soni' and 'doob' grass with a lining of very fine roots of these grasses ; there were also some roots of matted fur like that of a rat in the nest ; the entrance was at the side ; the whole thing was very artfully concealed."

These domed nests are often partially made of the grass growing round the cup-nest. In some instances the grass is merely bent over and over and hardly interlaced at all. In others the living grass is twisted in with other pieces of grass, forming quite a well-made, substantial dome.

The breeding season over most of its area is May and June, but in Assam I found nests also in July and August, no doubt second broods, while Lindsay Harvey, Inglis and Coltart all took nests in Bihar in March and April.

The eggs number three or four in a full clutch. Hume says that five is the usual complement, and Marshall (G. F. L.) also found five, but I have never seen this number, though I have seen two only incubated.

In colour the eggs are like those of the Siam Singing-Lark or the previous species, *cantillans*. Compared as a series with the eggs of the Siam bird they are very pale, poorly-marked eggs and have a much duller surface. The two extremes of coloration in my own series are shown in two pairs of eggs, both complete clutches. Of these one has a white ground rather sparsely marked with a few biggish blotches of sienna-brown and pale grey, with a good many specks of the same colours, most of both being at the larger end. The second pair has a warm pinkish-buff ground, the whole surface densely covered with small blotches of purplish-brown, still more dense at the big end. Other eggs are between these two extremes but most are nearer to the pale type.

Sixty eggs average 20.3×15.3 mm. : maxima 22.3×15.8 and 22.1×16.0 mm. ; minima 18.9×14.2 mm.

The nuptial flight of this Lark is rather striking. The bird sits on some bush, rail or other prominent site and then launches itself into the air, fluttering its wings very quickly and singing a sweet but not powerful song. When it has risen to some 50 feet or so, it stretches both wings out very stiffly and makes a long sliding stoop towards the ground but, before reaching it, again flutters upward. The glide and rise are repeated two or more times before the bird actually drops to the ground or to its original perch, where it often sings for a few seconds after its arrival.

Both birds incubate, though I do not think the male does much. They sit very close as soon as the full clutch of eggs has been laid, and may sometimes be caught on the nest before they will leave, but as a rule they quit just in time to avoid being stepped on.

Both sexes assist in the construction of the nest.

Incubation takes twelve days or perhaps only eleven in some cases, though I have not verified the latter.

(1233) *Mirafra assamica affinis* Jerdon.

THE MADRAS BUSH-LARK.

Mirafra assamica affinis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 339.

This subspecies is found in Ceylon and in India South of the range of the preceding bird.

As regards India there is very little on record. Tickell's note is to the effect: "Nest ordinary of grasses, 4 inches in diameter, placed on the ground under shelter of clods, tufts of grass etc., in fallow fields or in open patches in jungle. Eggs three or four." Jerdon records that "It breeds on the ground, making a loose nest of grass, and lays three or four eggs."

In Travancore Bourdillon and Stewart took nests in March, April and May.

Nests and nesting sites resemble those of the Bengal Bush-Lark and call for no further remark. In Ceylon also there is nothing to note about its nest, except that it is worthy of notice that Phillips took nests close to, if not in, marshy places and that these were both of the domed- and saucer-shaped types.

The breeding season in Southern India seems to be from March to May, but further knowledge of its breeding habits may extend this time. In Ceylon Jenkins, Phillips and Wait have taken eggs in every month from January to September.

In India three or four eggs are laid in a clutch, but in Ceylon never more than three and generally two only. In appearance they cannot be distinguished from those of the Northern race.

Fifty eggs average 20.6×15.5 mm.: maxima 23.1×15.8 and 21.9×16.0 mm.; minima 18.9×15.7 and 19.5×14.9 mm.

(1234) *Mirafra assamica microptera* Hume.

THE BURMESE BUSH-LARK.

Mirafra assamica microptera, Fauna B. I., Birds, 2nd ed. vol. iii, p. 340.

The Burmese Bush-Lark is found over the greater part of Burma from the Chin Hills and Arakan to Tenasserim. In Eastern Tenasserim it is probably replaced by the Siam form *marionæ*, of which the nidification is not yet known.

There is practically nothing one can say about the nidification of this bird which has not already been written about the Bengal

Bush-Lark. It frequents the same kind of country but sometimes may be seen in rather denser bush and grass than is usual with that bird. Hopwood took nests on ploughed land, the nest being placed under clods of earth, while K. C. Macdonald took many nests in Myingyan and Pakókku which he says were domed and placed under tufts of grass, stone or clods of earth.

The breeding season is late. Oates found eggs just hatching or batched in July, and since then Wickham, Harington, Macdonald, Hopwood and others have taken eggs from the beginning of June to the end of August.

The eggs are generally two only in number, sometimes three, while occasionally a single egg only is incubated.

The description given for the eggs of the Bengal Bush-Lark suffices for those of this species; every egg of the one can be matched with another from the other race.

Thirty-five eggs average 20.0×14.9 mm. : maxima 22.3×15.3 and 21.2×15.9 mm. ; minima 17.4×14.2 and 18.5×14.0 mm.

Mirafra erythroptera.

THE RED-WINGED BUSH-LARK.

(1235) *Mirafra erythroptera erythroptera* Jerdon.

THE DECCAN RED-WINGED BUSH-LARK.

Mirafra erythroptera erythroptera, Fauvel B. I., Birds, 2nd ed. vol. iii., p. 341.

This Lark is found over a great part of the drier districts of Northern India. It extends from the Eastern districts of the Punjab East to Western Bengal, where it occurs in Chota Nagpur and Manbhum, while it is by no means uncommon in parts of Bihar. South it extends to the Northern and Central Bombay Presidency and Rajputana and thence through the Deccan, Central and United Provinces. I know of no record from Orissa, and its distribution in Northern Madras still seems unknown.

Since Hume's 'Nests and Eggs' was written nothing more of any importance has been recorded about the nidification of this bird, probably because Hume's notes were so full. He writes:— "This and not *M. assamica* is the Bush-Lark *par excellence* of Northern India. Throughout the Central Provinces, the North-Western Provinces, the Punjab and Rajputana (except at the extreme West), and the drier portions of Oudh, this Lark abounds, and is perhaps the commonest resident Lark throughout this vast tract, as a whole. It breeds from March to August. The nest is never (so far as I know, and I have seen fifty) anything more than a larger or smaller pad of finer and coarser grass, in which at times a little vegetable fibre is intermixed, with a slight central depression. The situation chosen for the nest varies. I have found them in

a hoof-print, in a perfectly bare plain, in an equally bare field under clods of earth, in open country at the foot of some dense tuft of grass, in scattered jungle, at the foot of caper-bushes, or even young babool- or neem-trees, and in amongst grass. Later, when the rains have set in, heaps of kunker by the roadside or heaps of ballast beside the railway are often selected; and Mr. Brooks tells me that upon one occasion he found a nest containing the full complement of partially incubated eggs amongst the ballast between the rails, and almost under one of them, so placed that trains were perpetually passing over the birds, the rim of the wheel passing within 2 or 3 inches of her head."

Although Hume never found a domed nest other people came across them.

Bingham found a domed nest on the 27th September, while Butler writes of nests taken by him near Deesa:—"The nest as a rule is dome-shaped and placed under a tussock of grass, but in some instances consists of a pad of fine dry grass."

MacArthur, Betham, Davidson and Jones all speak of domed nests as being the normal type.

From the above we see that Hume found nests from March to August, while Bingham took others in September, and Davidson in Dhulia and Betham in Poona obtained others practically up to the end of October. They are undoubtedly double-brooded, and some birds perhaps rear three broods.

Full clutches of eggs vary from two to four, and they cannot, I think, be distinguished in any way from the eggs of other *Mirafra*s. Among unusual clutches the following may be noted. A single egg taken by Dr. Coltart with a pure white ground faintly marked with blotches of pale grey. A pair from J. M. D. Mackenzie's collection with a white ground very boldly marked with deep red-brown and purple-grey, the two colours suffusing to form broad rings round the larger ends. A set of four with pale grey ground profusely stippled all over with dark grey, very much like some eggs of the Tree-Sparrow.

Fifty eggs average 19.5×14.6 mm.: maxima 21.2×13.8 and 20.0×15.5 mm.; minima 17.9×14.0 and 20.0×13.6 mm.

In the nuptial display of this bird the red on the wings is very conspicuous, especially as he sails down to earth with wings widely extended.

(1236) *Mirafra erythroptera sindiana* Ticehurst.

THE SIND RED-WINGED BUSH-LARK.

Mirafra erythroptera sindiana, Fauna B. I., Birds, 2nd ed. vol. iii, p. 342.

Ticehurst, who separated this bird from the typical form, thus (Ibis, 1923, p. 17) defines its range:—"It "is a constant resident in

Lower Sind and in places is not uncommon, though patchily distributed. I have traced it from the Habb River on the Baluchi Frontier to Kotri on the Indus, and Blanford found it East of Umaket towards the Rajputana boundary.

"It is very definitely a bird of very sparse desert scrub-jungle, where scattered Euphorbias (cactus), together with a little desert-grass and stunted Acacias and Camel thorn-hushes, save an otherwise bare desert from being a howling wilderness of rock and sand. Outside such haunts I never met with this species, unless it was in similar but rather thicker jungle.

"The breeding season is evidently a very long one, and probably nesting only ceases during the moult; thus, I have found young on the wing in November, birds breeding in April, adults moulting in June, and others evidently breeding at the end of that month.

"*M. e. indianus* extends to the Punjab, Jodhpur and east to Etawah."

The nest and eggs have yet to be taken and described.

Galerida cristata (Linn.).

THE CRESTED LARK.

(1237) *Galerida cristata chendoola* Franklin.

THE INDIAN CRESTED LARK.

Galerida cristata chendoola, Fauna B. I., Birds, 2nd ed. vol. iii, p. 343.

This race of Crested Lark is found over practically the whole of Northern India from Sind and the Punjab East of the Indus, West to Bihar and the dry districts of Eastern Bengal, such as Ranchi and Hazaribagh, and South to Sambhur and Raipur in the Deccan and Rajputana.

Wherever found this form is resident, though it may move about locally under the influence of excessive rain or drought.

These birds breed in a wide variety of country ranging from rich cultivated areas to comparatively bleak desert, so long as this affords some protection in the way of scrub growth or sparse coarse grass. Possibly it prefers above the rest waste land on which there is a fairly plentiful supply of grass and bushes. It will, however, sometimes breed in ploughed land, sandy and muddy banks of rivers which have some growth on them and also, though rarely, in perfectly open bare places under the semi-shelter of rocks and stones. In Sind Ticehurst (Ibis, 1923, p. 18) says that "Nests in cattle-frequented desert were noteworthy, as in every case the site chosen was at the foot of a perpendicular miniature cliff three or four feet high, and wedged into an angle, so that it was in a position so that no cow could tread on it." Normally the positions they choose are much the same as are selected by most Larks, i. e.,

a depression in the ground, self-made or natural, under the shelter of a tuft of grass, small bush, rock or stone or, though seldom, under a clod of earth in ploughed fields. Lindsey Harvey, who sent me a nice series of the eggs of this bird, also found occasional nests made in growing crops.

The nests are quite typical of the family, loosely built shallow cups of grass, but they may generally be distinguished by the lining, which is often of materials other than fine grass, so universally used by other Larks.

Butler describes a nest taken by him near Karachi "composed of coarse dry grass, roots, etc., and lined with lumps of raw cotton, bits of rag, thread, etc., the exterior being encircled with a slight embankment of hard incrustated earth which had peeled from the surface of the ground that had been inundated."

Marshall (G. F. L.) says that in Saharunpoor he found a nest placed "in the middle of a village cart-track near a low bush, between the wheel-tracks, formed by lining a hollow with grass, roots, fibre, and little bits of straws, dry wheat-leaves, and stringy bark neatly put together."

Hume also writes:—"Exteriorly the nest is always composed of more or less fine grass, but the nests have generally a more or less regular lining of very fine grass, cotton, wool, soft vegetable fibre, hair, and even a few feathers. I think that, as a rule, the nests of this species may be distinguished at a glance by the lining."

Inghis says "nests often lined with wool and other oddments." Lindsey Harvey again notes: lined "often with wool, vegetable fibre, flowering ends of grass etc."

The breeding season over the whole area of this Lark is principally April and the first half of May; many birds, however, breed in March and a few even in February, while, where the site is above flood-level, a few continue to lay as late as the middle of June.

In this subspecies the eggs number three or four, one number as often as the other.

The ground is almost white, faintly tinged with grey, yellowish or, according to Hume, greenish. The markings consist of specks, spots and blotches of pale yellowish-brown to deep vandyke-brown, with secondary markings, similar in character, of neutral tint, often rather conspicuous. These markings vary considerably in density but are never thick enough to obscure the ground or make the eggs look unicoloured. In all they are most numerous at the larger end, where they form rings or caps in many eggs but, elsewhere, they may be quite scanty. In a few eggs there are a good number of freckles with a few comparatively big blotches scattered here and there.

In shape the eggs are broad ovals, a few rather pointed at the smaller end. Moderately long ovals may be also met with and every now and then a clutch of long, blunt ovals. The surface is

less glossy than in the *arvensis* group of Sky-Larks, though the eggs bear a strong family resemblance to these. They are also of a rather coarser texture and more fragile.

Fifty eggs average 21.5×16.4 mm. : maxima 23.5×16.2 and 22.0×17.3 mm. ; minima 19.8×16.1 and 22.0×15.3 mm.

(1238) *Galerida cristata magna* Hume.

THE AFGHAN CRESTED LARK.

Galerida cristata magna, Fauna B. I., Birds, 2nd ed. vol. iii, p. 345.

This larger subspecies of the Crested Lark only breeds within our boundaries on the North-West Frontier of Afghanistan and Baluchistan, where it is very common. Outside our limits it extends to Transcaspia, Mesopotamia, Persia and Turkestan.

Rattray, Perreau, Whitehead and others record this Lark as very common on the hills of the Afghan Frontier, breeding up to 7,000 feet, while Marshall, Betham and Williams say that it is equally common at Quetta and other places on the Baluchistan Frontier.

As regards nest and nesting-site there is little one can add to what has been written about the preceeding race. At Thall, the entrance to the Kurram Valley, Rattray found it breeding in very bare stony country, making "its not very tidy nest of grass under the protection of stones and rocks."

About Quetta Betham and Williams also found the nest often placed on bleak, bare hill-sides where there were but few bushes and only some withered grass, the nest being usually well concealed in the latter.

The breeding season in India is from the end of March to the middle or end of May, most birds laying in April. In Mesopotamia they appear to breed in March and April, and in Persia, where they are extraordinarily common, in May, a few birds laying in late April and early June.

Petherick, who sent me a fine series of eggs from Persia, says that it is there a very common, tame bird, generally building in fields of standing corn.

The eggs number four or five in a full clutch, rarely three only, but in Persia the complement is usually six.

They are quite similar in appearance to those of *G. c. chendoola*, though as a series rather darker and more richly marked, while in many the markings are blotches of some size.

Sixty eggs taken in Mesopotamia and on the Indian Frontier average 22.6×17.1 mm. : maxima 24.2×16.7 and 24.0×18.4 mm. ; minima 20.0×16.9 and 21.1×15.3 mm.

One hundred Persian eggs average 22.1×17.0 mm.

(1240) *Galerida deva* Sykes.

THE DECCAN SMALL CRESTED LARK.

Galerida deva, Fauna B. I., Birds, 2nd ed. vol. iii, p. 347.

This little Lark occurs over the greater part of Western India, except Sind and Western Punjab westwards, and is found as far South as Mysore. It is plentiful in the United Provinces, Central Provinces and Deccan, while it is also found in Madras.

It is a bird of open country, like most Larks, but does not seem to mind if this is waste land, dry, open, uncultivated semi-desert or cultivated fields. It does not occur, except casually, and certainly does not breed, in the barest desert and, equally, not in very wet humid areas. Probably it prefers above all mixed cultivation and waste land in patches, while it certainly often shows a liking for the vicinity of water, though, as Hume remarks, it likes the sites of its nest well drained.

Sometimes it may build its nest inside a field of long grass or high crops, but this is exceptional. Generally it is situated where bush or grass cover is scanty yet sufficient to completely hide the nest when placed under its protection.

In Poona it is a very common bird and Betham found many nests there, mostly placed in waste land under patches of grass or a small bush, but one nest was built in fallow land under a clod and another in grass by a village path.

The nest is the usual Lark's nest, a cup of grass etc., but it is generally much more compact than other Larks' nests and, though grass may form a chief part in the construction, roots, fibres and other material are well interwoven with it. The nest itself may be from 3 to 4 inches across—Hume says $4\frac{1}{2}$ —and anything up to $2\frac{1}{2}$ inches deep, with a hollow for the eggs about $2\frac{1}{2}$ inches in diameter by about 1 in depth. It is sufficiently well made to stand removal and a good deal of handling before it disintegrates. In some nests there is a slight lining of grass, while in others it is more ample and is composed of grass, roots, hair and similar oddments.

Hume gives the breeding season as June to August, but this is not long enough. In Dhulia Davidson took eggs up to the end of October, and Capt. Payn took them at Mahableswar in early May. In Poona Nisbett, Betham and others have found eggs from May to October, but the great majority of birds at that place lay in August, September and October. Probably many birds have two broods.

Two or three eggs only are laid, though Betham obtained one four-clutch in Poona.

Hume says that he thinks the eggs of this Lark vary more than those of any others. My series does not show this. They have a range of colour exactly equivalent to that of the *Galerida cristata* group, though as a series they are less grey and more yellowish.

On the whole, also, the stippling is finer and a few eggs do look almost unicoloured light earthy brown.

In shape the eggs are most often broad ovals, but a good many are longer and rather elliptical, a few only being at all pointed.

The texture varies more than usual. Some eggs are quite dull-surfaced, whilst others have a distinct gloss; in none is the grain very fine, and the dull eggs are more fragile than the glossed ones, i. e., the texture is not so close.

Fifty eggs average 19.9×14.6 mm.: maxima 23.0×15.1 and 19.8×15.4 mm.; minima 17.5×14.0 and 18.3×13.8 mm.

Both sexes take part in incubation, though the female takes the greater share. Both also assist in the construction of the nest. I have been told that incubation takes thirteen days, but I have no proof of this.

(1241) *Galerida malabarica* (Scop.).

THE MALABAR CRESTED LARK.

Galerida malabarica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 348.

This is another Western form of Lark, being a resident from Guzerat to South Travancore, extending to Ahmedahad and over the greater part of the Deccan. It ascends the Nilgiris and other hills to at least 4,000 feet and perhaps higher. Like all *Galeridas*, this species haunts open country, sometimes well covered with grass and with many bushes dotted about; sometimes tracts of cultivated fields and, sometimes, again, very bare bleak country. Vidal gives a fine description of this latter and with it a description of nests and their sites which is very exhaustive. He writes (Hume's 'Nests and Eggs,' vol. ii, p. 239):—"This Southern Crested Lark breeds at Ratnagiri in October and November, after the heavy rains have ceased. There is a rugged laterite plateau of considerable extent to the east of the station, where this species is plentiful for the greater part of the year; this tableland is entirely bare, and appears as a huge sheet of flat rock, the laterite cropping to the surface everywhere. During the south-west monsoon, however, rank grass sprouts up wherever the crumbling surface affords a hold for the roots—lilies, hardy creepers, and ferns shoot up from the fissures in the rocks, and here and there coarse hill-grains are sown in the least unpromising patches of ground. The Crown-crests, as a rule, affect no concealment in their choice of a site. A slight hollow in the bare ground or hard rock, either natural or scraped out by the birds themselves, is filled in with grass of two kinds, a coarse quality for the outside and a finer for the inside. No other material is used, and the grass is somewhat loosely put together. In shape the nests are rather shallow cups, with an internal diameter of about $2\frac{1}{2}$ inches. Nests formed on the bare ground are fully exposed to view on three sides but are invariably shaded or sheltered on the remaining side by a stone or chip of rock,

which is sometimes more, but never less, than twice the height of the nest from the ground. The only Crown-crest's nest I have found without this flanking stone was placed under cover of thin grass. There is one distinction between all the nests of the Crown-crested Larks and the Finch-Larks that I have observed, and that is, that while the Crown-crest's nest is always placed in a depression of the ground, the Finch-Lark's nest always rests on the level surface. I am aware, however, that this distinction does not hold good in other localities."

To the above one must add that sometimes, though rarely, a few roots are used in the composition of the nest.

The eggs number two or three in a full clutch, and I have no record of four. They are typical Larks' eggs and resemble those of Sykes's, or the Deccan, Crested Lark, but are of course larger. The ground is white, grey-white or brown-white but, most often, yellowish-creamy. They are freely speckled all over with sienna or yellowish-brown on the creamy eggs to brown or blackish-brown on the others. Underlying these are specks and spots of lavender and grey, but they are never very conspicuous.

In texture they vary from quite glossless to faintly glossed and in shape from fairly broad to rather long ovals.

Forty eggs average 21.5×15.5 mm. : maxima 24.1×17.0 and 23.6×17.3 mm. ; minima 19.0×13.0 mm.

Hume gives the average of eighteen eggs as 22.0×16.5 mm., and it should be noted that the average size of those measured by me are reduced by a series of very small eggs from Travancore.

Ammomanes phœnicura.

THE RUFOUS-TAILED FINCH-LARK.

(1242) *Ammomanes phœnicura phœnicura* (Franklin).

THE INDIAN RUFOUS-TAILED FINCH-LARK.

Ammomanes phœnicura phœnicura, Fauna B. I., Birds, 2nd ed. vol. iii, p. 350.

This Finch-Lark is found East of a line which may be roughly drawn from the Rann of Cutch to Delhi, whence it extends to Dinapore in Eastern Bengal with the Ganges as its Northern boundary, except in Bihar, while South it occurs as far as Mysore and Travancore.

Like other Larks, this bird also only breeds in open lands but, unlike others, its favourite site for the nest is in a ploughed field. Blewitt says that this is so in Raipur ; Whitehead says the same about Sehore and Betham repeats it in regard to nests taken by him both at Mhow and at Poona.

Coltart and Lindsey Harvey both say that this Lark is not rare in Bihar North of the Ganges, where they both obtained nests and eggs. In this district most of their nests were found in fallow

fields protected by clods of earth or by tufts of grass or weeds. Occasionally the nest, according to Betham, is placed actually under a stone or clod of earth, and is then very difficult to locate.

Sometimes it builds in hollows on river-banks, as found by Nunn at Hoshangabad, or on the bank of a tank as found by MacArthur. Tickell also records taking its nest in long grass, but probably this identification is not correct and refers to a *Mirafra*.

The nest varies greatly. Blewitt says that the score of nests found by him were all just hollows in the ground with no grass or other materials to line them. This, however, is exceptional, and as a rule the nest is a pad of grass, rice-straw or roots pretty well put together. Sometimes it is even more elaborate than this. Hume notes that it is sometimes "lined with softer materials"; Nunn says it is "lined with wool and feathers," while Butler took one "well lined with rats' fur and goats' hair."

The breeding season over most of its range is practically restricted to March and April, though a few birds may lay in early May and late February. In Sehore Whitehead found them breeding freely in early May, while in the Central Provinces MacArthur took eggs as late as the 15th of that month.

The full complement of eggs is three or four, three quite as often as four. They could not, I think, be distinguished from the eggs of the Crested Larks of the *chendoola* and *magna* groups, but as a series they are more often marked with zones or caps at the larger ends.

Most eggs have the ground pale grey, pale buff or pale brown-grey, very rarely pale greenish. The marks consist of specks and tiny blotches of pale sienna-brown, grey-brown, reddish-brown, dark umber-brown or even blackish. These are freely scattered over the whole surface but are nearly always more numerous at the larger end where, as already noted, they often form rings or caps.

Fifty eggs average 21.2×15.7 mm.; maxima 23.2×15.8 and 23.0×16.5 mm.; minima 19.1×15.4 and 21.2×14.3 mm.

The texture is similar to that of the eggs of *G. c. chendoola*, but a little closer and harder. In shape most eggs are rather broad ovals but a few are longer, narrower and more pointed.

Ammomanes deserti (Licht.).

THE DESERT FINCH-LARK.

(1244) Ammomanes deserti phœnicuroides Blyth.

THE INDIAN DESERT FINCH-LARK.

Ammomanes deserti phœnicuroides, Fauna B. I., Birds, 2nd ed. vol. iii, p. 352.

This fine Lark occurs in the breeding season in North and Western Kashmir, Afghanistan and Baluchistan to the North-West Frontier Provinces, Punjab, Sind and the Mekran Coast. Magrath obtained

its nest near Khar, on the North-West Frontier; Cock, Buchanan and Rattray found it nesting freely around Nowshera in the Punjab, and it certainly also breeds in Sind. In Hume's time Cock alone had taken the nest, which he described as follows:—"This Lark breeds in the low hills of the Peshawar Valley. Its nests are abundant in the hills near Nowshera. May and June are the nesting months. The nest is placed under a shelf of rock or flat stone upon the ground and is constructed of grass-stalks lined with fine roots, and the bird piles up little pieces of flat stone all round the nest, just as I have observed *P. grisea* do in that neighbourhood. The eggs resemble those of *P. grisea*, only they are much larger. Three seems to be the usual number, but I think I once took four eggs out of one nest."

Whitehead says that it is "resident and abundant on stony wastes and hill-sides up to 3,000 feet" in the Kohat and Kurram Valleys, but he did not find the nest.

In Sind Ticehurst writes (Ibis, 1923, p. 19) it "is the Lark of the stony hills, which, running from Jacobabad in the North, form an almost unbroken chain to the sea at Cape Menze, and in places is very common. Here it is found right at the foot-hills, and I have seen it up to about 1,500 feet.

"Barnes says it breeds from April to June, and this, I think, is correct; during the breeding season the pairs are very scattered and the nests are hard to locate."

My small series of eggs shows them to be exactly like those of the preceding bird.

Sixteen eggs average 22.1×16.4 mm. : maxima 23.2×17.0 mm. ; minima 19.8×15.0 mm. ; this last is from an abnormally small clutch taken by Magrath.

Erimopterix grisea.

THE ASHY-CROWNED FINCH-LARK.

(1245) *Erimopterix grisea grisea* (Scop.).

THE INDIAN ASHY-CROWNED FINCH-LARK.

Pyrrhuloxia grisea, Fauna B. I., Birds, 2nd ed. vol. iii, p. 353 (part.).

Erimopterix grisea grisea, ibid. vol. viii, p. 664.

Since the 'Fauna' was written Ticehurst has separated the bird from North-Western India on account of its paler, greyer tint. This greatly reduces the area occupied by the present and typical form. Roughly, it may be said to be resident in India West and South of a line drawn from Baroda South of Indore and Bhopal and thence North to Fategarh and Bareilly. It is also a common resident in Ceylon. East it extends to extreme Eastern Bengal and Western Assam.

This little Lark breeds in almost any kind of open country but never on land with any long growth on it. It often makes its

nest on absolutely bare ground where no vestige of vegetation grows in the immediate vicinity of the nest. Vidal found it breeding at Ratnagiri on the laterite plateau, where it built its nest on the bare surface of the sheet rock. Sometimes its nest may be situated in fields of quite short grass, often at the foot of some longer tuft of grass or a small bush, at other times with nothing near it but the short grass. In some districts a favourite nesting-site is one in among the stubble in dry paddy-fields where the cover is very scanty. Often the nest is placed in fallow or ploughed land under the partial shelter of a clod of earth. Curious sites are sometimes chosen, such as the roof of a house, as described by Captain Horace Terry, or in between the rails of a railway line, where one was found by Hume at Etawah, and where trains passed many times a day over the head of the sitting bird. Not quite so unusual was another nest found by Anderson made in a hoof-mark in the middle of a pat of cow-dung.

The nest itself is a small shallow cup made of grass but lined with wool, hair, bits of rags and all sorts of oddments. Nests found by Vidal on the laterite near Ratnagiri were "invariably lined with shreds of wool (probably stolen from the blankets of cowherds)."

A very noticeable feature of the nests of this Lark is the little ring of small stones which the birds pile round the nest as a tiny barricade. Sometimes when stones are not available little bits of dry mud are used instead.

The breeding seasons are principally February and March and again July and August, according to Hume. Adams says that in Sambhur the season is from March to August, and at Raipoor Blewitt gives the same months. Burgess, however, says that in Western India this Lark breeds in January and February, while in Poona nests have been taken from December to March. In fact, odd eggs may be found throughout the year but, on the whole, it may be said to be a cold-weather breeder, many birds having a second or even third brood later in the year.

In number the clutch is two or three, though A. J. Currie obtained one of four in Bolaram. They are typical Lark's eggs, and the chief character which strikes one, when viewing a series, is their rather yellowish tint. The ground varies from white to buffy-white or, less often, greyish-white or greenish-white. The whole surface is freely speckled with brown, varying from pale sienna-brown to rich red-brown, greyish-brown or blackish-brown. Occasionally one sees capped eggs, but zoned specimens are quite exceptional.

In shape the eggs vary from rather broad ovals to decidedly long ovals, seldom very pointed at the smaller end. The texture is rather finer and closer than in *Galerida* eggs, but there is no gloss.

One hundred eggs average 19.1×13.7 mm. : maxima 20.2×14.5 and 19.8×14.7 mm. ; minima 16.0×13.2 and 17.0×12.5 mm.

(1245 a) *Erimopterix grisea siccata* * (Ticehurst).

THE SIND ASHY-CROWNED FINCH-LARK.

Pyrhulauda grisea, Fauna B. I., Birds, 2nd ed. vol. iii, p. 353 (part.).*Erimopterix grisea siccata*, *ibid.* vol. viii, p. 004.

Ticehurst gives the following distribution for this race of Finch-Lark :—Sind, Punjab, Rajputana, Gurgam, Indore, Cutch, West United Provinces to Fategarh etc.

The breeding of this bird differs in no way from that of the typical form. Hume found it breeding in Etawah in May; Anderson records their breeding at Fategarh from the latter end of February to the end of March; Betham took eggs near Ferozepore in February and Harington Bulkly near Karachi in September.

Ticehurst writes (*Ibis*, 1923, p. 20):—"The breeding season is a long one, April to October, and even when breeding it seems to associate together in small parties on its feeding grounds. The male has a typical Lark-like flight during the breeding season. Out of the desert it is but seldom met with, but in October and November 1918, when rain had not fallen for 15 months and so the food-supply had failed, flocks used to frequent cut lucerne-fields."

Nests and eggs require no description beyond that already given for the typical form.

The few eggs I have seen vary in size from 17.3×13.0 to 19.0×13.8 mm.

Erimopterix albifrons Sundevall.

THE BLACK-CROWNED FINCH-LARK.

(1246) *Erimopterix albifrons affinis* (Blyth).

THE INDIAN BLACK-CROWNED FINCH-LARK.

Pyrhulauda frontalis affinis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 355.*Erimopterix albifrons affinis*, *ibid.* vol. viii, p. 005.

This little Finch-Lark is found in Sind and the Punjab as far East as the Jumna.

Although several ornithologists, among them Bulkly, Lindsey Smith, Eates and, I believe, Bell, have taken the nests of this bird in Sind since Hume's 'Nests and Eggs' was written I can find nothing recorded. I therefore quote Hume's notes in full:—

"Mr. Scrope Doig found the nest of this species in Sind. He says :—'This bird, wherever there are sand-drifts, is very common and is never, so far as my experience goes, found in company with *P. grisea*. They breed at the end of February and beginning of

* *Pyrhulauda grisea siccata* Ticehurst, *Bull. B. O. C.* vol. xlv, p. 87 (March 1925): Deesa, Rajputana.

March, at the end of May and commencement of June, and again in the end of August and beginning of September. One breeding-place I found in this latter month was situated away from the Narra, some 10 miles out in the desert near some salt deposits, and where evidently rain had fallen, as there was a considerable growth of grass. The nests were very similar to those of *P. grisea* both in size and description, and were invariably placed at the root of some tuft of grass, on the North side, evidently to be sheltered from the hot wind. In this place I collected over forty eggs. They are very similar to those of *P. grisea*, perhaps, as a rule, more holdly marked, and some of them had well-defined rings of colour round the larger end. The normal number of eggs is two."

Hume's series of eggs do not seem to me to be in any way distinguishable from those of the two race of *E. grisea*, but possibly are more often zoned at the larger end.

Eggs in my own collection, taken in May, are matched by many eggs of *E. grisea*.

Hume gives the measurements of his eggs as varying in length between 17.3 and 20.8 mm.; while in breadth the extremes are 12.7 and 14.7 mm.

All my eggs come within these measurements, and thirty average 19.2×13.8 mm.

Family ZOSTEROPIDÆ

(WHITE-EYES).

Zosterops palpebrosa.

THE INDIAN WHITE-EYE.

In 'The Ibis,' 1922, pp. 142-7, I reviewed this genus at some length, and in the Bull. B. O. C. xlvii, p. 88, 1926, Ticehurst comments on this review. In the first place he considers that the type-locality of Dussumier's *palpebrosa* cannot be Orissa, as it is said to be Bengal. In Temminck's time, however, Orissa formed part of Bengal and, as I have recorded elsewhere, in the early 'eighties a race of Ooriyas flourished who did much bird-catching and selling of skins and cage-birds. Again, *Zosterops* was a favourite cage-bird even when I went to India in 1881 and, on the whole, Orissa was the most likely place for Temminck's bird to have come from. Orissa must therefore stand as designated by me, and Ticehurst's *nilgiriensis* becomes a synonym of *palpebrosa*. On the other hand, Ticehurst is certainly right in separating the North-West bird on account of its brighter, more yellow plumage, though its range does not seem to me to be quite so extensive as given by him.

The group is a most difficult one to diagnose, but this is not the place in which to enter at great length into a discussion, and I only note my reasons for retaining my own classification with the addition of Ticehurst's *occidentis* from North-West India.

(1247) *Zosterops palpebrosa palpebrosa* (Temm.).

THE INDIAN WHITE-EYE.

Zosterops palpebrosa palpebrosa, Fauna B. I., Birds, 2nd ed. vol. iii, p. 358.

The typical form of White-Eye, of which the type-locality is Cuttack in Orissa, is found in Southern and Western Bengal, South Central Provinces and the whole of Southern India, East and West from the hills of Mysore and Travancore.

This little bird is a very common resident throughout the plains of Southern Bengal and Southern India, ascending the Nilgiris at least to 6,000 feet and casually considerably higher. I include in this race the bird breeding in Poona, which is somewhat intermediate between *occidentis* and *palpebrosa*, while birds from Guzerat and Rajputana are nearer to, or identical with, the former.

The nidification of all the White-Eyes is much alike and a description of the nests and eggs of one subspecies suffices for all.

They frequent and breed in almost any kind of country, but are seldom found in deep forest, preferring gardens, open cultivated country, open waste land with bushes, hedges etc., and the neighbourhood of villages. They also breed in scrub and semi-pasture-lands and in secondary growth in deserted cultivation.

The situation for the nest varies in great degree. The first nest I ever found was built in a croton-shrub not 2 feet from the ground near a tank in Calcutta, the next was nearly at the top of a Poplar-tree in the Nadia district and fully 30 feet from the ground. These were of the Northern race, while of this one Davison makes the same remark about its breeding in the Nilgiris, and says that while some nest in hedges 2 or 3 feet from the ground, others may be found 20 or 30 feet up in trees.

Around Kotagerry Miss Cockburn says that out of eleven nests found by her ten were on wild gooseberry-bushes.

Probably three out of four nests will be found within 10 feet of the ground, and the majority even of these will be under 6 feet.

The nest is a very beautiful little cup made of miscellaneous materials, among which grass, fine roots, moss and lichen predominate. With these are mixed cobwebs, spiders' egg-bags, hair and tiny bits of vegetable cotton, down and wool. The materials are closely interwoven and very compact, being bound together with cobwebs or with silk from cocoons of various silk-moths. Outside the whole is decorated with spiders' egg-bags, lichen etc., and I have noticed that these decorations are often used even when they in no way help to identify the nest with its surroundings.

Most nests are deep cups, rather more than hemispherical, but occasionally shallow cups may be met with. An average nest measures about 2.25 inches across by 1.25 deep externally, with an egg-chamber about 1.5 inch in diameter by nearly an inch in depth. The lining is neat and tightly wound round, consisting in most nests of fine grass-stems, less often of fine roots or other fibrous material. Now and then hair or the mycelæ of fungi may be used.

Almost invariably the nest is built pendent or semipendent from small forks of outer branches of bushes and trees, less often from two or more twigs and, still more rarely, it is placed in an upright fork.

Davison, Miss Cockburn and Wait give the breeding season for the Nilgiris as February to May, but Davidson found them breeding in Kanara in June also, while in Poona nests with eggs have been taken in June, July and September. In Orissa the birds do not breed until the Rains break in June but, as with so many other very common birds, eggs may be taken in other months also from January to early October. The birds are double-brooded in many instances but not always.

In Southern India the normal clutch seems to be two only, more rarely three, but farther North three is the usual number.

In colour the eggs vary from a skim-milk blue to a blue nearly, but not quite, as dark as that of a Hedge-Sparrow's egg. In shape the eggs vary considerably; most are short blunt ovals, but longer, more pointed eggs are not exceptional. The colour fades very quickly in these eggs, and those which are deep blue soon become little darker than the others.

Forty eggs average 15.4×11.5 mm.: maxima 18.2×12.0 and 17.2×11.1 mm.; minima 13.5×10.9 and 14.0×10.3 mm.

Both sexes assist in building the nest and both take part in incubation which, I believe, lasts eleven days. A nest of three eggs in which the last was laid on the 20th May were all hatched on the 1st June.

(1248) *Zosterops palpebrosa elwesi* Stuart Baker.

THE NORTHERN WHITE-EYE.

Zosterops palpebrosa elwesi, Fauna B. I., Birds, 2nd. ed. vol. iii, p. 360.

Owing to the recognition of the North-West Indian forms as distinct the range of this race has to be greatly curtailed. It may now be defined as follows:—

Sikkim and the Himalayas East to the Kauri-Kachin Hills and Northern Shan States. West possibly over a portion of Nepal South to the Northern Central Provinces, Bandelkhand, Western Bengal and the districts of North-Eastern Bengal and Bihar.

There is nothing to remark on in the nidification of this subspecies as differing from that of the preceding bird. It haunts the same

kind of country, builds the same kind of nest and places it in similar positions.

Pitman obtained one nest quite out of the ordinary, built under an overhanging leaf of a Teak-tree on a branch a few feet from the ground. The bird flying off revealed the nest, which was quite hidden. It seemed to be regularly sown on to the leaf and its stalk.

The breeding season is from May to August, most eggs being laid in late June after the Rains have broken.

The full clutch is three or four, generally the latter, and in appearance they cannot be distinguished from those of the other races.

Forty-five eggs average 14.7×11.5 mm. : maxima 16.0×11.4 and 15.2×12.3 mm. ; minima 12.9×11.1 and 14.2×11.0 mm.

(1248 a) *Zosterops palpebrosa occidentis* Ticehurst.

THE NORTH-WEST WHITE-EYE.

Zosterops palpebrosa occidentis, Ticehurst, Bull. B. O. C. xlvii, p. 88 (1927); Fauna B. I., Birds, 2nd ed. vol. viii, p. 665.

The distribution of this race of White-Eye is, in my opinion, not quite so wide as given by Ticehurst but, of course, where two subspecies meet they almost invariably merge into one another, and the precise point where they become indefinite may vary in different observers' ideas. I would give the range as Guzerat, North to Baluchistan and more or less throughout the whole of the North-West Frontier Province and the Punjab. The United Provinces birds seem to be definitely *elwesi*, while those of the Garhwal and Simla Hills are equally certainly *occidentis*.

Nests and eggs and the sites chosen are similar to those of other White-Eyes. In Simla Dodsworth says that they breed commonly in the gardens and on the roadsides as well as in open but well-wooded country.

They breed from the level of the plains up to about 8,000 feet but, more commonly, below 5,000, at which latter elevation Whympers found them numerous about Naini-Tal.

In the hills this White-Eye breeds in April and May, while Thompson also found a nest in March in Garhwal, and a few birds lay in June (Whympers). In the plains most eggs will be found much later. Anderson records that in the North-Western Provinces they breed in June, July and August; Betham got nests in Guzerat in July and August, while others have taken nests in the Punjab from July to October, the latter exceptional.

Forty-eight eggs average 15.2×11.5 mm., showing them to be rather longer in proportion to their size than those of *elwesi*: maxima 17.0×12.0 and 15.1×12.2 mm. ; minima 14.1×11.5 and 14.4×11.0 mm.

(1249) *Zosterops palpebrosa egregia* Madarász.

THE SMALL CEYLON WHITE-EYE.

Zosterops palpebrosa egregia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 361.

This race of White-Eye is confined to the Laccadives and Ceylon, but Bourdillon always thought that the bird in the extreme South of Travancore was the same as the Ceylon form.

This White-Eye makes a little pendent cup-nest just like those of its cousins in shape and size, but often moss is included among the materials of which it is built. Generally this is used on the outside only but, sometimes also, is mixed in with the other materials of the walls. The lining is often of hair, sometimes that of human beings.

They seem to breed at great heights from the ground more consistently than the other races of *palpebrosa*. Phillips speaks of nests over 30 feet from the ground, while Tunnard notes: "This nest was built at the thin end of a branch of a tall Cyprus-tree about 12' from the ground. Cyprus-trees seem to be great favourites with these birds, as I have seen many nests built in them, and know of at least three in this particular tree at the beginning of the year, but they were all too high up for me to get the eggs."

Phillips found them breeding in the tea-bushes in Tea Estates at elevations up to 4,000 feet, while Wait says their nests are generally placed in slender forks of branches of small trees between 6 and 20 feet from the ground.

Wait also refers to their gregarious habits, which (*vide* Tunnard, *supra*) seem to persist even in the breeding season.

Phillips, Tunnard and Jenkins took most of their nests in April and early May, while the second-named also found nests "in the beginning of the year." Wait says that the breeding months are June and August.

The number of eggs laid is two or three, one as often as the other, and they are of the usual pale spotless blue.

Thirty-five eggs, including those in Wait's collection, average 15.7×11.5 mm. : maxima 16.5×12.0 and 16.5×12.3 mm. ; minima 14.0×11.3 and 14.6×10.7 mm.

(1250) *Zosterops palpebrosa cacharensis* Stuart Baker.

THE CACHAR WHITE-EYE.

Zosterops palpebrosa cacharensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 361.

This little White-Eye is restricted to the South of the Brahmaputra River in Assam, extending East through Manipur and the Chittagong district to the Chin Hills. How far North-East it is found through the Naga Hills I do not know, but Coltart and

I both found *elwesi* to be the form in Margherita and the Dibrugarh District.

It breeds from the plains up to the top of the Barail Range, some 6,000 feet, but is more common in the plains and up to about 3,000 feet than above this height.

As regards its breeding habits there is little to say. Nine nests out of ten will be found within 10 feet of the ground and many within 4 or 5 feet. Occasionally, however, it is built very high up. As regards the sites of the nests, these differ from those of other White-Eyes in being often in evergreen forest, though the birds select open glades, sides of streams or jungle-tracks even in these. They were also not rare in the open park-like lands in the North of North Cachar, where I found their nests in the numerous Oak-trees which dotted the whole surface of the wide rolling grass-lands.

The breeding season is from the last week in April to the first week in July, three eggs out of every four being laid in May. The normal number in a clutch is four, less often three, and I have once taken five.

Sixty eggs average 14.8×11.6 : maxima 15.7×12.0 and 15.1×12.3 mm.; minima 13.2×10.2 mm.

In this race of *Zosterops*, and probably in all others, both sexes incubate, as we have frequently trapped both on the nest. Both also perform part of the duty of nest-building, but probably the female does most of it. I have occasionally been able to watch the process and, while one bird did all the arranging of the material, the other only worked rather intermittently at bringing it, and I presume this was the male. The latter, however, is a good father, and I have seen him busy feeding the young.

(1251) *Zosterops palpebrosa nicobarica* Blyth.

THE NICOBAR WHITE-EYE.

Zosterops palpebrosa nicobariensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 362.

Zosterops palpebrosa nicobarica, ibid. vol. viii, p. 665.

As its name infers, this White-Eye is found in the Nicobars and also in the Andamans and Car Nicobar.

Numerous nests of this bird were taken by Osmaston in the Andamans and others in the Nicobars and in Car Nicobar. In the Andamans Wickham and Anderson also obtained nests in the vicinity of Port Blair. Osmaston says they are common, breeding preferentially in small saplings in secondary growth but also in gardens, roadside avenues and open forest. The nest calls for no further description.

Anderson and Wickham seem to have taken eggs in May only, but Osmaston says they are late breeders, and he took eggs in the Andamans and Nicobars from the 6th May to the 9th July. One

nest, however, found by him in Car Nicobar contained two eggs on the 18th March.

Generally two eggs only are laid, three fairly often, and once Osmaston found four eggs in a nest.

In appearance they are quite typical of the species, but much larger than those of the other races.

Thirty-one eggs average 16.2×12.2 mm.; maxima 17.5×12.6 and 16.7×13.0 mm.; minima 14.9×12.0 and 16.3×11.9 mm.

Zosterops simplex Swinhoe.

THE CHINESE WHITE-EYE.

(1252) **Zosterops simplex peguensis** Stuart Baker.

THE PEGU WHITE-EYE.

Zosterops simplex peguensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 363.

The range of this White-Eye extends over the greater part of Central Burma from Karenni and Maymyo to about the latitude of Pegu or a little South of that district.

The nest is like those of the various races of the preceding species and, like them, is placed generally low down in bushes but sometimes at great heights in tall trees. The sites selected are nearly always in open country, rarely in light woods and never in heavy evergreen-forest, but the birds are very partial to the rather thin secondary growth on deserted cultivation. Occasionally also they breed in gardens.

Most of my correspondents describe the nest as just like that of *Zosterops palpebrosa*. Macdonald, Osmaston and Mackenzie all say that it is a stout little nest, and the first-named describes some sent me as follows:—"These nests and eggs are just like those of the common Indian White-Eye, very neat little cups of fine grass, well matted together with bits of spiders' webs and then lined with the finest grass-stems. The outside of the nest has some moss, cotton down and other material mixed in with the grass, but it is all very neatly and compactly finished off. It is, of course, pendent, like an Oriole's, between small twigs or in a horizontal fork."

Hopwood alone says that the nest is a "neat but flimsy cup."

Mackenzie obtained one nest with three eggs on the 14th April at Maymyo, but with this exception all eggs taken by the other collectors named were found between the 3rd May (Osmaston, Maymyo) and the 11th July (Hopwood, Maymyo).

The eggs of this species are quite typical of the genus, but very rarely one finds pure white eggs, not blue eggs so pale that they look white, but eggs of a true chalky white with no tinge of any other

colour. Two or three eggs are laid, and once Macdonald found a clutch of four.

Twenty-six eggs average 15.7×11.3 mm.: maxima 17.0×12.0 and 16.7×12.2 mm.; minima 14.0×9.4 mm.

(1253) *Zosterops siamensis* Blyth.

THE SIAMESE WHITE-EYE.

Zosterops siamensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 364.

The Siamese White-Eye is a resident over the whole of Burma, from Mt. Victoria in the Chin Hills on the West and from the Southern Shan States on the East to Southern Tenasserim, while farther East again it occurs throughout Siam and Cochin China. This is a bird alike of plains and high mountains, being resident and breeding both in the mangrove-swamps along the sea-shore and on the highest hills, such as Muleyit and Mt. Victoria, up to 7,000 feet. It is more of a forest bird than any of the White-Eyes already dealt with except the Cachar race of *palpebrosa*. It does not, however, breed far into the interior of forest, and is often also found in open but well-wooded grass-lands.

Two nests and eggs and four birds—the parents—were collected for me near Moulmein in Tenasserim on the 24th and 27th March, and Mackenzie obtained one nest on the 13th May near Tavoy. These are all the nests and eggs of which I have any knowledge. The two nests sent me were built “very high up in trees standing in open grass-land.” The nests were the usual neat little cups of grass, moss, roots and a soft fibrous material, probably bark, closely woven and matted together with silken down and spiders’ webs. The linings were of very fine grass-stems.

The eggs are quite typical and ten average 15.1×11.4 mm.: maxima 16.1×11.8 and 14.5×12.0 mm.; minima 13.9×11.7 mm. and 15.0×11.0 mm.

Zosterops aureiventris.

THE GOLDEN-VENTED WHITE-EYE.

(1254) *Zosterops aureiventris aureiventris* Hume.

THE PLAINS GOLDEN-VENTED WHITE-EYE.

Zosterops aureiventris aureiventris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 365.

According to Robinson and Kloss this White-Eye is “a coastal form ranging from Tenasserim along the coast of the Malay Peninsula to Banca and possibly Java and the low country of Eastern Sumatra.”

It is probably resident and breeds wherever found, but there seems to be no record of either nests or eggs. W. A. T. Kellow found it to be common on the West side of Perak and took many nests and eggs, of which he sent me a beautiful series of seven clutches together with the parent birds of four of the seven.

The nests were all alike and much the same as those of other White-Eyes. They were made principally of grass mixed with down from a Cotton-tree (*Bombax* sp.) and a little moss, the whole well plastered with spiders' webs and lined with fine grass or fibre. One was built in a Mango-tree fully 30 feet from the ground, the rest all in thin secondary growth in deserted rice-land, in bushes about 6 feet from the ground.

The breeding season is from February to May, and Kellow obtained fresh eggs from the 3rd February to the 21st May.

The full complement of eggs is two or three, generally the latter.

The eggs are quite typical, but perhaps averaged, when fresh, a rather deeper blue than those of either *palpebrosa* or *siamensis*.

Twenty eggs average 15.5×11.8 mm. : maxima 16.3×12.1 mm. ; minima 14.1×11.3 mm.

(1255) *Zosterops aureiventris mesoxantha* Salvadori.

THE KAREN GOLDEN-VENTED WHITE-EYE.

Zosterops aureiventris mesoxantha, Fauna B. I., Birds, 2nd ed. vol. iii, p. 365.

This appears to be the hill form of the preceding bird, inhabiting the hill ranges of Central and Eastern Burma from the Southern Shan States to the mountains of Tenasserim and Siam, South to Selangor.

So far as I know the eggs of this race of White-Eye have never been taken until this year (1933), when Mr. T. R. Livesey found them breeding freely during April in Sintaung in the Southern Shan States, and obtained a fine series of nests and eggs of which he sent me four clutches containing four, three, three, and two eggs respectively, together with some beautiful photographs.

The nests are quite typical White-Eyes' nests, most of them pendent from small forks or twigs of bushes in thick scrub-jungle or dense undergrowth. One, however, is placed in among the upright spiky shoots of a large-leaved shrub quite close to the ground. In appearance they are small neat cups, possibly rather less compactly put together than those of the *palpebrosa* group, but made of similar materials and about the same in size.

The eggs, which in full clutches number three or four, are quite typical, but on an average slightly deeper blue than those of the other White-Eyes, though, doubtless, they soon fade to the same pale tint.

Twelve eggs average 15.5×11.8 mm. : maxima 16.2×12.0 and 15.5×12.1 mm. ; minima 14.1×11.8 and 15.2×11.4 mm.

(1256) *Zosterops ceylonensis* Holdsworth.

THE LARGE CEYLON WHITE-EYE.

Zosterops ceylonensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 366.

This large form of *Zosterops* is confined to Ceylon, and its reported occurrence in the Nilgiris is probably due to mistaken identification.

According to Wait this bird is not obtained below 3,000 feet, but Phillips has found it breeding at 2,800 feet and Jenkins saw a nest with young at about 1,500 feet.

This is a bird of the forest and only to a lesser extent of tea- and rubber-plantations, where it breeds not infrequently in the high seed-tea and sometimes on rubber-vines. Occasionally, also, it builds its nest as high up as 30 feet in a forest-tree, but generally it selects a site somewhere between 4 and 10 feet from the ground in a thick bush or small sapling. Tunnard took nests from (1) a thin branch of a Sappa-tree 20 feet from the ground, (2) several nests in low bushes in his garden, (3) in low Grevillea-trees a few feet from the ground, and (4) in forest-trees high up.

The nests are very similar to those of other White-Eyes, but Tunnard, comparing the nests of this bird with those of *egregia*, the small White-Eye, remarks:—"I am convinced that there is a difference between the nests of this bird and *egregia*. That of the latter is more solidly built, and in no case have I ever been able to see daylight through it like one can in many of those of *ceylonensis*; besides, those of *egregia* are not so deep."

The materials seem to be much the same, though both Phillips and Tunnard repeatedly found moss, often a considerable amount, used in the construction of the nest, especially on the outside. Like the nests of other White-Eyes, those of the present species are almost invariably pendent from small forks or from two or three fine twigs.

The breeding season is during March, April and May, and the season seems to be a far more definite one than it is with most Ceylon birds. The only date recorded outside these months is one nest taken by Tunnard on the 8th February.

The normal complement of eggs is two or three; no one has taken four or seen a single egg incubated.

They are quite typical *Zosterops*' eggs in colour and texture, smooth and very fine but glossless pale blue. In shape, however, they are comparatively longer and less broad.

Thirty-three eggs, which include series taken by Tunnard and Phillips, average 16.5×12.0 mm.: maxima 19.0×11.8 and 16.4×12.9 mm.; minima 15.1×11.2 mm.

Family CHALCOPARIIDÆ

(RUBY-CHEEKS).

Chalcoparia singalensis.

THE RUBY-CHEEK.

(1257) *Chalcoparia singalensis singalensis* Gmelin.

THE MALAYAN RUBY-CHEEK.

Chalcoparia singalensis singalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 368.

This curious little bird is a resident over the whole of Burma, West and South Siam, the Malay States, Sumatra and Java.

The Ruby-Cheek is a bird of forest and jungle, well-wooded open country with ample cover, throughout the broken plains at the foot of the hills and the hills themselves up to some 1,500 or even 2,000 feet.

The only naturalists to take the nests and eggs of this bird have been Oates in Pegu and Herbert in Siam, and as their descriptions do not agree in all points, though both are correct, it is necessary to quote from both.

Oates writes (Hume's 'Nests and Eggs,' vol. ii, p. 269) :—

"The bird appears to nidificate from the middle of May to about the end of July. On the 3rd June I found a nest with two eggs nearly hatched. It was suspended from a branch of a mango-tree about 20 feet from the ground and well surrounded by leaves. On the 25th June another nest was found from which the young had apparently just flown. It was about 8 feet from the ground. On July the 6th a nest with two nearly fresh eggs was discovered hanging in a shrub about 4 feet high, and on the 8th of the same month another quite completed but with no eggs. It was attached to the extreme tip of a hamhoo about 25 feet from the ground.

"The nest is a very lovely structure, closely resembling that of *Ploceus baya* in shape, with the tube cut off at the level of the bottom of the nest. At a short distance off it looks like a mass of hair combings. Three nests are composed throughout of black hair-like fibres very closely woven. With these are intermingled numerous small cocoons, pieces of bark, a few twigs here and there, and large lumps of the excreta of caterpillars. The interior is sparingly lined with fine grass. A fourth nest was made almost entirely of strips of grass, a very small quantity only of black fibre being used. Some huge pieces of bark, nearly as large as the

bird itself, were suspended by cobwebs from the lower part of the nest.

"The nest is pear-shaped, about 6 inches in height, and barely 3 inches outside diameter at the thickest part. The upper two inches are solid. The entrance is about halfway down, and measures $1\frac{1}{2}$ by 1. The bottom of the egg-chamber is about 1 inch below the top of the entrance, and the thickness of the walls everywhere is about one-third of an inch. The wonderful part of the nest is the verandah or portico. This springs from the upper edge of the entrance and extends to two or three inches below the bottom of the nest. Laterally it extends to rather more than the width of the nest, the sides being incorporated with the main structure all the way down. It is made of the same materials as the other portions, is about $\frac{1}{4}$ inch thick, and very strongly woven and elastic."

Herbert found nests in Siam, generally built in lime-bushes, 4 to 8 feet from the ground, and "when hanging from the leaves at the end of a branch not easily recognizable as a nest. It is of quite a distinctive type and the six nests I have taken have all been exactly the same. The portico is a very prominent feature and is nearly as large as the egg-chamber. The nesting material is fibre of various degrees of coarseness, that of the interior being comparatively fine, whilst that of the outside presents quite a ragged appearance. Cobwebs are extensively used for keeping the numerous threads in their places."

The eggs taken by Oates have a white or faintly pinkish-white ground, densely speckled with grey and purplish-grey, not unlike some eggs of the Cinnamon Sparrow. The eggs taken by Herbert have a more purple-tinged ground, while the markings vary from the tiniest freckles, which cover the whole surface of one egg, to bold blotches of purple-black with underlying smudges of violet-grey. Two clutches are intermediate and are clouded with grey with smaller specks and blotches of purple-black. These eggs can all be matched with the eggs of *Anthreptes malacensis*.

In shape the eggs are rather long pointed ovals, the texture exceptionally fragile and not very close.

Seven eggs average 16.75×11.85 mm. : maxima 17.7×12.0 mm. ; minima 16.0×12.0 and 16.8×11.3 mm.

(1258) *Chalcoparia singalensis rubinigenis* Stuart Baker.

THE INDIAN RUBY-CHEEK.

Chalcoparia singalensis lepida, Fauna B. I., Birds, 2nd ed. vol. iii, p. 370.

Chalcoparia singalensis rubinigenis, ibid. vol. viii, p. 665.

This is a sub-Himalayan form occurring throughout the Terai

from Sikkim to Eastern Assam, the hills and adjoining country South of the Brahmapootra; Manipur, the hill-tracts and districts of Bengal East of the Bay, and in Dacca and Mymensingh districts on the West.

The haunts of this little bird are forest, scrub and small tree-jungle and the secondary growth in deserted cultivation. The few nests I have seen have all been built in the bush and tangled scrub growing on the sites of abandoned villages, or else in deserted hill-rice fields where the soil was poor and the new growth scanty and only growing in patches.

The three nests taken by myself were all attached to tiny drooping twigs of small bushes and were between 2 and 4 feet from the ground. In appearance they were like large pears covered with black hair—in fact, very much like the nest of the preceding bird described by Oates. They were all three made of very fine fibres, torn, I think, from the trunks of palm-ferns, mixed with fern-rachides and the stalks of maidenhair-ferns, the lining also being of the same material. The nests measured roughly $4\frac{1}{2}$ by $3\frac{1}{4}$ inches externally and the large entrance was protected by an overhanging porch, just showing the lower edge. In no case was the porch produced so low as the bottom of the nest, as in that of the Burmese form. The nests were very compactly and stoutly built, although all the ends hung down everywhere in the most untidy fashion.

My three nests were taken on 23rd March and on the 6th and 17th June, the first two containing each two hard-set eggs, while there was a single fresh egg in the third.

These are all of the Sparrow's-egg type; the single egg is an obtuse oval, densely speckled with brown-grey, a little less dense at the smaller end, while the others are decidedly pointed ovals, one pair densely and the second pair less densely speckled with blackish-grey. The second pair has an almost confluent ring of blackish specks at the larger end.

Eight eggs average 16.9×12.05 mm. : maxima 18.3×12.3 mm. ; minima 16.0×11.7 mm.

I have never caught the cock bird on the nest, so cannot say whether it assists in incubation and, judging by analogy, should not expect it to do so.

Family NECTARINIIDÆ

(SUNBIRDS and FLOWER-PECKERS).

Subfamily NECTARINIINÆ

(SUNBIRDS).

(1259) *Chalcostetha chalcostetha* Jardine.

THE COPPER-BREASTED SUNBIRD.

Chalcostetha chalcostetha, Fauna B. I., Birds, 2nd ed. vol. iii, p. 373.

This beautiful Sunbird extends from Tenasserim to Singapore, Sumatra, Borneo, Java (type-locality), Palawan and other islands. It also occurs in Siam and Cochin China (Delacour).

This species is resident and must breed wherever found, but its nests and eggs have not yet been taken within our limits. It is a bird of evergreen-forests in the plains and lower hills up to some 3,000 feet, but is said also to frequent flower-gardens and open country round villages. Where rubber-plantations have been opened out these are said to be very favourite resorts.

In Java Mr. T. Houwing found this bird breeding in great numbers, and the following is a summary of his remarks sent me with a fine series of the eggs:—"In nine nests out of every ten found by me the nest has been built in a rubber-plantation, generally hanging pendent from a small outer branch of a rubber-tree or less often on some small shrub or sapling at the edge of the jungle adjoining the rubber-trees. The nest is a lovely pear-shaped structure, roughly about 6" long by about 4½" at the widest point, but sometimes these measurements are exceeded by an inch or so, especially in length if the neck of the pear is much drawn out. The materials consist of bits of leaves, moss, grass-roots and feathers all well interwoven and mixed with Kapak" (down from seeds of *Bombax malabarica*) "which is felted in with the rest. Over the entrance there is a porch which comes down to the lower edge, completely protecting it from rain. This and the outside of the nest are often decorated with spiders' cocoons, caterpillar excreta etc. The lining is of cotton-down or vegetable silk, sometimes mixed with hair or feathers, but sometimes all Kapak. The full clutch of eggs is invariably two."

The breeding season lasts from early April to the end of September, most eggs being laid in May and June.

In ground-colour the eggs are pale grey, olive or buff-stone colour, mottled all over with pale sepia or purplish-brown, and with spots

and small blotches of black or deep purple, with the edges paler and looking as if the colour had run. In some eggs the latter markings are absent, and I have one pair mottled with grey instead of brown.

In shape the eggs are short, blunt ovals, the texture is fine, very fragile and glossless.

Thirty eggs average 15.0×11.1 mm.; maxima 16.1×10.7 and 15.4×11.9 mm.; minima 12.9×11.1 and 15.0×10.3 mm.



Æthopyga siparaja Raffles.

THE YELLOW-BACKED SUNBIRD.

(1260) *Æthopyga siparaja cara* Hume.

THE TENASSERIM YELLOW-BACKED SUNBIRD.

Æthopyga siparaja cara, Fauna B. I., Birds, 2nd ed. vol. iii, p. 376.

This Yellow-backed Sunbird ranges from about the latitude of Rangoon in Central Burma to the extreme South of Tenasserim; it also occurs in South and South-West Siam.

Hopwood is, I believe, the only collector who has taken the nest and eggs of this bird. Two nests taken by him in Tavoy on the 16th January and 18th February are described as "in each case resembling the nest of *Æ. seheriae*. They were neatly woven, pear-shaped, with no portico, and thickly lined with silky papyrus, probably of *Calotropis* sp.; each nest contained a single egg."

In *epistola* Hopwood informs me that the two nests were pendent from small branches of bushes about 3 or 4 feet from the ground.

The two eggs, now in my collection, differ greatly. One is very like a small egg of the common Purple Sunbird, the ground grey-white faintly tinged with yellow, profusely freckled with grey, becoming less and less towards the small end. The second egg is a beautiful creamy pink, marked exactly like the other egg but with bright brick-red. This I should imagine to be an abnormal erythristic egg.

In shape the eggs are short, pointed ovals, glossless and very fragile.

They measure 15.2×11.1 and 14.9×10.6 mm.

(1261) *Æthopyga siparaja nicobarica* Hume.

THE NICOBAR YELLOW-BACKED SUNBIRD.

Æthopyga siparaja nicobarica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 377.

This Sunbird is confined to the Nicobars, where it is said to haunt open country and the outskirts of forest and to be especially partial to coconut-groves.

There is nothing recorded about the nidification of this Sunbird

beyond the fact that Davison was shown a nest by Stoliczka which had been fastened "to the very end of a long, narrow pandanus-leaf, about 30 feet from the ground."

(1262) *Æthopyga siparaja seheriæ* Tickell.

THE INDIAN YELLOW-BACKED SUNBIRD.

Æthopyga siparaja seheriæ, Fauna B. I., Birds, 2nd ed. vol. iii, p. 378.

Since the 'Fauna' was written considerable additions to our knowledge of the distribution of this Sunbird have been made. It extends through the outer hills and plains at their feet from Sikkim to Eastern Assam. It occurs in the Chin Hills, excluding the range of Mt. Victoria, and has been found breeding on the Yu River, Upper Chindwin.

Osmaston obtained it at 6,000 feet in Darjiling, while Tytler found nests at 1,000 feet higher still in the ranges of the Naga Hills.

This is a common breeding bird in the plains of Assam, almost equally common up to 3,000 feet in the hills and then decreasing rapidly in numbers up to 6,000 feet. It is a forest-breeding bird normally, though occasionally nesting in more open country. Neither Hodgson nor Möller, the only collectors recorded by Hume as having taken the nest in Nepal and Sikkim, give any description of the type of country in which the nests were found. Since then I have personally obtained it breeding in dense evergreen-forest in Cachar and the Khasia Hills; Primrose and Inglis took it in the hottest and greenest of forests in the Goalpara plains; Masson obtained one nest in deep evergreen-forest in Sikkim and Stevens found it in similar cover in the same country.

The birds seem nearly always to select ravines in which to breed, fixing their nests to the roots of plants and bushes which hang free from the upper part of a bank when the underpart has been washed away in the Rains. At other times they choose similar places under banks in the forest, while odd nests may be sometimes obtained attached to bracken-fronds, small bushes or even to a spray of bamboo. They prefer very dark gloomy parts of the forest and, unlike most birds, do not haunt the open glades, river banks or similar, more sunny situations.

The nest is pear-shaped with a portico generally, but not always, built over the entrance. Most nests measure between $5\frac{1}{2}$ and $6\frac{1}{2}$ inches in length by 3 to 4 across the widest part, though the length depends a good deal on the amount of pendent decorations the birds think fit to add to the outside.

The materials used vary a good deal. Hodgson describes the nests as "composed of black moss- and other roots, with a little moss compactly interwoven with some cobwebs and lined with silky cotton-like fibre."

Möller says "the external portion of the nest is composed entirely of fine black rootlets, loosely felted with grass. Inside, the entire nest is lined with the extremely fine pale brown flower-stems of flowering grasses, and the whole of the bottom of the cavity is thickly filled with fine silky seed down."

The nests taken in Assam by Coltart, Inglis, Primrose and myself were similar in shape to those described above but were made in great part of cotton-down held together with fine roots and mixed with moss, grass-seed ends and scraps of grass-stem, the porch over the entrance being made principally of roots and the lining of *Bombax* seed-down. In some nests oddments of all kinds were added as external decorations; sometimes the nest looked like a mass of fine roots, at other times like a mass of wind-blown cobwebs caught on a branch or among the roots hanging from the bank.

The breeding season seems to be May and June, while a few birds lay in July and, on the other hand, in Nepal and Sikkim in the higher ranges over 5,000 feet many lay in April.

The full clutch of eggs laid is two or three, one as often as the other.

They vary greatly in colour and character, the following being among the types represented in my collection:—

(1) Pure white ground, speckled sparsely with dark brown, the specks a little more numerous at the larger end.

(2) White, lightly blotched with dark brown except at the larger ends, which have broad zones of dark brown, the marks almost coalescing.

(3) Pale cream, minutely flecked all over with very pale reddish.

(4) Cream, profusely marked with brick-red, reddish-brown or brown, the markings even more numerous at the large end, where they form indistinct caps or rings.

In shape the eggs are broad, blunt ovals, occasionally rather longer and pointed.

The texture is very fine but not very close, the surface is dull and the shell very fragile.

Thirty-one eggs average 15.1×11.4 mm.; maxima 16.3×11.6 and 15.9×12.0 mm.; minima 14.3×11.2 and 14.4×10.3 mm.

(1263) *Æthopyga siparaja mussooriensis* Stuart Baker.

THE KUMAN YELLOW-BACKED SUNBIRD.

Æthopyga siparaja mussooriensis, Fauna B. I., Birds, 2nd ed. vol. iii., p. 380.

This Sunbird is found from the Afghan frontier through the Murree Hills and Kuman to Garhwal at elevations of 5,000 feet upwards.

Like the preceding bird, this one frequents forest and scrub-jungle but, unlike that bird, the nest is, so far as is at present

known, always attached to the end of twigs of bushes and brambles quite low down.

Whymper, who took a number of nests about Naini Tal between 6,000 and 7,000 feet, describes the nests as like those of *seheria* taken by Möller in Sikkim but with more cotton-down, like those found by Primrose and myself.

He writes:—"The pear-shaped nests are placed low down in briar bushes. Over the entrance there is a slight porch. They are made of fibre and lined with white vegetable-down, showing through the network of fibre. A few dead leaves, strips of bark etc. are stuck on the nest and allowed to hang down."

All Whymper's nests were taken between the 1st and 25th July and contained either two or three eggs. These are nearly all of the third type described for the preceding bird but are a little darker red. One clutch of three is marked with light brown but not very densely.

In shape and texture they are similar to other eggs of the genus.

Fifteen eggs average 15.3×11.4 mm. : maxima 16.2×12.0 mm. ; minima 14.4×11.5 and 15.0×10.5 mm.

(1264) *Æthopyga siparaja andersoni* * Oates.

THE SHAN STATES YELLOW-BACKED SUNBIRD.

Æthopyga siparaja viridicauda, Fauva B. I., Birds, 2nd ed. vol. iii, p. 381.

Æthopyga andersoni Oates, Fauna B. I., Birds, 1st ed. vol. ii, p. 349, 1890 (Bhamo).

Accepting *andersoni* and *viridicauda* as one and the same bird, its range embraces the Kauri Kachin Hills, Shan States and Yunnan, where it seems to be found at elevations between 4,000 feet, at which height Osmaston obtained it breeding near Maymyo, and 6,000 feet in Yunnan, where Forrest obtained several specimens in scrub-jungle.

There is nothing on record about its nidification, but Osmaston has given me a clutch of three eggs taken by him at Maymyo on the 11th June, 1915, together with the following note:—"The nest was pear-shaped, suspended from a twig of a hush, about 4' from the ground, in my garden. It was composed of vegetable fibre and moss, decorated outside with caterpillar droppings and lined with down. There was no overhanging porch."

The eggs, which are just like those of *seheria* of the grey type, measure 15.3×11.4 , 15.2×11.4 and 15.0×11.5 mm.

* An examination of the material available shows that *andersoni* may possibly be retained as a subspecies on account of the somewhat greyer and duller under-plumage. This, however, is the only difference between *viridicauda* of Rothschild and typical *seheria*, as the colours of the forehead are not constant and possibly the lilac tinge is due only to preparation. *Viridicauda* therefore becomes a synonym of *andersoni*. It is a very poor race.

(1265) *Æthopyga siparaja vigorsii* Sykes.

THE DECCAN YELLOW-BACKED SUNBIRD.

Æthopyga siparaja vigorsii, Fauna B. I., Birds, 2nd ed. vol. iii, p. 381.

The Deccan Sunbird is found over the whole of Western India from Bombay and Poona to the South of Travancore. Jerdon also recorded it from Bastar, South-East of Nagpur, but this record has never been confirmed. The only information as to its breeding is that given in Hume's 'Nests and Eggs.' A note by Mr. Ludovic Stewart runs:—"I found a nest of *Æthopyga vigorsii* at Mahabaleswar carefully hidden in a trellis of passion-flower in the verandah of my house. It was purse-shaped, of moss and lichen outside, and soft pappus of a composite plant within, a round opening near the top but no shelf over the opening. I did not take the nest (June 8th) as it contained three young."

Davidson and Wenden, who took several nests, write:—"Fairly common along the Ghâts and breeds at Mahabaleswar"; and Wenden adds: "17th September, found nest suspended from bush growing out of face of cutting at upper entrance of No. IV. Tunnel, Bhore Ghâts. Shot both male and female. Missed the latter twice, but that did not deter her from returning in a couple of minutes after being fired at. Three eggs quite fresh. On 21st September found another up a hill-side, about 200 yards from where I got the first. It was suspended from the outer end of a branch, 5 feet from the ground."

On the 16th August, 1919, Mr. T. R. O'Donnel obtained a nest with two eggs at Poona. The nest he describes as "Purse-like, delicately woven, with portico, attached to twig over stream and ornamented with scraps of bark, paper and caterpillar's excretae." As Stewart found three young in a nest on the 8th June it would appear that the breeding season starts in the middle of May and continues up to the end of September.

The eggs apparently number two or three, the full complement with most birds of the genus.

The only two clutches in my possession, one pair taken by Davidson and one by O'Donnel, may be matched by many eggs of *Arachnechthra* and are not typical of the genus *Æthopyga*. The pair taken by Davidson have a pale buff ground, almost entirely concealed by darker freckles of buff-grey in one egg and of dull reddish in the other. The two eggs taken by O'Donnel have an almost white ground, faintly freckled with greyish-brown, rather denser and darker at the larger end. The four eggs measure 18.3×12.3 , 17.8×12.6 , 17.1×12.8 and 15.0×11.8 mm.

Æthopyga ignicauda.

THE FIRE-TAILED SUNBIRD.

(1266) *Æthopyga ignicauda ignicauda* Hodgs.

THE NEPAL FIRE-TAILED SUNBIRD.

Æthopyga ignicauda ignicauda, Fauna B. I., Birds, 2nd ed. vol. iii, p. 383.

This beautiful Sunbird extends from Garhwal and Nepal East to Assam, Manipur and the Chittagong Hill Tracts.

This is a forest bird and is found in the Himalayas at great elevations. Whymper obtained it on the Pindari glacier at 12,000 feet in the Birch-forest, while Osmaston found it breeding on the edge of Silver-fir forest at 11,500 feet above Darjiling in Sikkim. In the hills South of the Brahmapootra, though a very common bird in Winter, only a very few remained to breed in the highest ranges at 6,000 feet and over. The difference in the size of the eggs and in the description of the nests taken in the Himalayas and those in the Assam ranges would lead one to believe that there is some mistake over one description or that there are two races of this bird differing in size. In all the nests taken by myself the hen bird was trapped on the nest and in one case the male bird also shot. Osmaston's nests and eggs, equally well identified, agree in all details with those taken by Whymper, and there can be no doubt about them.

The nests taken by myself were all built on the stems of bracken-fronds growing either in or at the edge of evergreen-forest, very humid and with an undergrowth of Jasmine, Caladiums, ferns, bracken and brambles. In each case also the ground was very steep and broken with many boulders and outcrops of rock. The nests were all much alike; in shape they were rather like short-necked broad pears, with an entrance almost at the top and with no porch. The chief material was down from the seed-pods of *Bombax malabarica* held together with little strips of moss, many spiders' webs and a few bits of grass. The lining was simply cotton-down without an admixture of anything else. In a nest taken in the Khasia Hills, fibres were substituted for the grass and moss. These materials were most plentiful at the neck of the pear or oval, and were used with the spiders' webs to wind round the supporting stem of the bracken.

Osmaston gives a very different account of the nest and eggs (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 513, 1904). He writes:—"This beautiful Sunbird affects higher altitudes than any other species with which I am acquainted. It is found in summer in the forests of silver-fir and rhododendron between 10,000 and 12,000 feet. On the 27th May, while descending a steep wooded slope at an elevation of 11,000 feet through a forest of silver-fir, birch and

rhododendron, with an undergrowth of dwarf-bamboo (*Arundinaria aristata*) I came on the nest of this species suspended about 3 feet above the ground from a lateral branchlet of a bamboo which had been incorporated into the nest. It is oval in shape, 6" in height by 4" in diameter, with a small round hole $1\frac{1}{4}$ " across near the top. It is composed externally of moss interwoven with black rhizomorph. Next comes a layer of thin pink papery rhododendron-bark followed by a lining of fine grass, flowers and feathers."

The eggs of this and another nest taken in a similar position at 11,500 feet are now in my collection.

One pair has a pale violet-white ground, covered all over with purplish speckles, while the other pair have a pale brick-red ground with darker brick-red freckles over the whole surface, a little denser at the larger end. Three eggs taken by Whympers are exactly like the pair just described taken by Osmaston.

They vary between 15.7 and 17.0 mm. in length and between 12.0 and 12.5 in breadth.

The eggs taken by myself are more like those of *gouldiæ*. The ground is white; in one set of three there are a few specks or tiny blotches of brown scattered irregularly over the surface, and in the other more numerous little blotches of brown, with well-defined broad rings at the larger end. They measure between 14.3 and 15.5 mm. in length and between 11.0 and 11.7 mm. in breadth.

Twelve eggs average 15.6×11.8 mm.; maxima 17.0×12.0 and 15.7×12.5 mm.; minima 14.3×11.7 and 14.5×11.0 mm.

My nests with eggs were taken in April and May, those taken by Whympers and Osmaston in May.

Æthopyga gouldiæ.

THE YELLOW-BREASTED SUNBIRD.

(1269) *Æthopyga gouldiæ gouldiæ* Vigors.

THE SIMLA YELLOW-BACKED SUNBIRD.

Æthopyga gouldiæ gouldiæ, Fauna B. I., Birds, 2nd ed. vol. iii, p. 385.

This Sunbird is an inhabitant of the Himalayas from the Sutlej Valley to the East of Assam. Birds from the higher peaks, above 6,000 feet, in the Assam Valley seem referable to the typical form, as do birds from Mt. Victoria in the Chin Hills above this same elevation. During the breeding season these birds are found from 6,000 feet upwards to at least 12,000 feet, keeping to forest or to its outskirts.

Tytler found it breeding commonly between 6,000 and 8,000 feet, generally nearer the latter elevation, in the Naga Hills, and sent me a beautiful series of eggs and nests. The nests are all exactly like

those of *isolata* found by me in the Cachar Hills, which are fully described later on. Those taken by Tytler were all affixed low down to thin branches of small bushes or brambles. The breeding season is June and early July and the number of eggs laid two only.

The ground in all Tytler's eggs is white, one pair is spotless but all the rest are thinly freckled with small blotches of pale reddish-brown, slightly more numerous at the larger end, and in one pair, the best marked, forming fairly definite rings.

Ten eggs average 14.6×11.2 mm. : maxima 15.3×11.5 mm. ; minima 14.2×10.9 mm.

(1270) *Æthopyga gouldiæ isolata* Stuart Baker.

THE MANIPUR YELLOW-BACKED SUNBIRD.

Æthopyga gouldiæ isolata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 386.

I found this Sunbird not uncommon between 3,000 and 6,000 feet in the North Cachar Hills and at about the same heights in the Khasia Hills. It is essentially a forest-bird, and breeds sometimes in glades and by river-banks in the interior of the forest and sometimes in among bracken and shrubs on the edge of cultivation patches. The nests that I have found have nearly all been attached to the stems of bracken and all very carefully concealed, being only a foot to 3 feet from the ground. One or two have been on thin branches of brambles or small bushes, but even these were in among bracken. They choose spots in which the old fronds of the previous year have not been burnt but surround and intermingle with the growing new plants, making it practically impossible to spot the nest unless the bird is watched on to it. The nest is roughly pear-shaped or oval and, at first sight, looks as if made only of pure white *Bombax* seed-down, but when examined closer is seen to be held together with whisks of moss, grass-stems or a long brown fibre, possibly a fungus. In most nests there is not much of this visible but occasionally the outside is almost covered by it. The lining is merely the same cotton-tree down but put in without mixture of other materials ; at first it is very fluffy and soft but later, more especially when the young are hatched, it works into a sort of soft felt. The entrance is large and is very near the top and without any porch. The nest is always pendent and the materials are well wound round the bracken-stem, at which point only moss, grass or fibre are used, thickly mixed and strengthened with spiders' webs. In size the nests vary greatly. The largest run up to 7 inches in length by about $2\frac{3}{4}$ in breadth at the widest part, while an unusually small one measured only 4.6 inches in height and 2.2 in width. The egg-chambers measure roughly about 2 to $2\frac{1}{4}$ inches in diameter by about 2 inches in depth below the lower edge of the entrance.

The breeding season is May and June and the last half of April.

The full clutch of eggs numbers two or three, generally the former, while in appearance they are indistinguishable from those of the typical form already described.

I have, unfortunately, given away all my eggs but two without measuring them. These two measure 14.0×10.0 mm. but were, I think, rather on the small side. Measurements given by me in 'The Asian' newspaper nearly forty years ago were very roughly taken in decimals of an inch and are hardly worth recording.

Both birds assist in building the nest, as I have seen the male carrying materials for it and I have also seen him carrying food to the young.

(1271) *Æthopyga dabryi* Verr.

THE FLAME-BREASTED SUNBIRD.

Æthopyga dabryi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 387.

This Sunbird, which was described from Szechuan, extends from Western China, Kauri-Kachin Hills and Shan States to Muliyet. I also found, over forty years ago, what I believed at the time to be this species breeding in North Cachar, but the specimens are not now available for examination, and we never trapped a male on the nest, though we saw them in the immediate vicinity and I shot similar males in the same forests. These, with their conspicuous flame-coloured breasts, differed very strikingly from the much paler yellow-breasted *isolata*, which also occurred in these forests. I give my notes on the breeding for what they are worth.

Three nests with eggs, with others given away many years ago, were found by me personally at Hangrum on the 7th and 11th May and the 7th June at an elevation of some 5,200 feet upwards. The nests were all much the same—oval-shaped, made of fine fibrous material, mixed with a little moss, a few shreds of grass well wound together and lined with the most beautifully white soft cotton-down, showing through the other materials in places. They were fixed to bracken-fronds and in each case the materials were well wrapped round the midribs of the frond with no pear-neck between the supports and the egg-chamber, differing in this respect from the more or less pear-shaped nests of *isolata*. The bracken selected for the site was always in forest of rather stunted Oak (*Quercus serratifolia*) with undergrowth of ferns, Jasmine, Raspberries etc., while every tree and stone was covered with luxuriant green moss, hanging in great wreaths from every branch. Everywhere also grew masses of Orchids such as *Celogyne odorata*, *Vanda cœrulea*, *Dendrobium chrysotoxum*, *D. dalhousianum* etc., many in full bloom during May and June, forming a scene of great beauty for the little birds to breed in and an ample attraction for the tiny insects on which they live.

All my eggs, so far as I remember, or have notes, were taken between the 7th May and the 30th June, but I remember seeing

two young in a nest hatched in the first week in May, so evidently laid about the 20th April.

In appearance the eggs are like those of *Æ. siparaja seheriæ*, but I have one clutch which is very pretty, all three eggs being white with small, sparse, primary blotches of reddish-brown and a few secondary ones of lavender. In some clutches of the *seheriæ* type the markings form well-defined zones at the larger end.

In shape and texture they are quite typical of the genus.

Eight eggs average 14.3×10.8 mm.: maxima 15.1×10.6 and 14.6×11.1 mm.; minima 13.5×10.8 and 15.0×10.5 mm.

In every nest found we trapped the female on the nest. She sat until we almost knocked against the nest, returning to it on each occasion within five minutes of our leaving it.

Æthopyga saturata.

THE BLACK-BREASTED SUNBIRD.

(1272) *Æthopyga saturata saturata* Hodgs.

THE NEPAL BLACK-BREASTED SUNBIRD.

Æthopyga saturata saturata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 388.

The typical form of Black-breasted Sunbird is resident and breeds from Kuman, Garhwal, through Nepal and Sikkim, to Eastern Assam, Cachar, Manipur, the Chin Hills and Yunnan (Forrest).

It is not a bird of high levels. In the Patkoi and other Naga ranges it breeds between 3,000 and 5,000 feet; in Cachar it bred actually in the broken foot-hills, under 1,000 feet altitude, while in Naini Tal Whymper got many nests at 4,500 feet.

It frequents jungle for breeding purposes but it does not seem to matter of what kind this is—forest, evergreen or deciduous, dense or open; also scrub, secondary growth or even bamboo, though this latter is exceptional.

In Cachar A. M. Primrose found it breeding in ravines in the foot-hills where the forest was of great height but the undergrowth not very dense. In Margherita Coltart and the Patkoi Nagas only obtained nests in very dense, very humid forest, where the ground was very broken. As regards Naini Tal, Whymper, in a letter to me, writes of some nests and eggs which he kindly gave me:—"The above are very interesting nests. I saw them built, but I never found them anywhere but in that one place, a deep dark nullah with a stream down the middle and the nests, four in all, were close to it. As a matter of fact they had to be close to the stream, as the nullah was very narrow and the banks steep and close to one another. It was in forest and at an elevation of 4,500 feet."

Whymper's nests and all the others I have seen were practically exactly alike, and a description of one suffices for all. In shape they are broad pears with a well-defined neck, sometimes slightly drawn out, with a porch over the entrance, the lower edge of which is about on a level with the bottom part of the entrance. Roughly the nests measure 5 to 6 inches in length and about $2\frac{1}{2}$ to 3 inches across, the porch projecting rather more than $\frac{1}{2}$ inch beyond the walls of the nest. The cavity is about 2 inches in diameter and the same in depth. A nest taken in Cachar by Primrose was bigger, measuring about 8 inches in height, with an egg-cavity 2 by 2 inches. They are compactly made of fibre, moss and a few grass-stems, moss being the principal material, but well kept together and compacted with the other materials. Whymper does not mention silk or cobwebs, but in those I have seen in Margherita these materials were always used in some degree to tighten up the fabric. The lining is always of the finest cotton-down in great quantity.

Nests found by Whymper were attached to thin branches of bushes or low down in creepers and nettles. Other nests have all been either in bushes or attached to ferns, climbers and bracken at any height from a few inches to 4 feet from the ground.

The breeding season is May, June and July and I have eggs taken from the 12th May to the 13th July.

The number of eggs laid is two or three.

Some are like the eggs of *seheria* but most are rather unusually coloured for Sunbirds. The ground is white, as usual, but the markings consist of specks, spots and, occasionally, blotches of inky-black with secondary ones of inky-grey. These are normally sparse over the greater part of the egg but more numerous in a ring at the larger end.

In shape the eggs are broad ovals and in texture quite normal.

Twenty-five eggs average 14.6×11.3 mm.: maxima 15.3×12.0 and 14.7×12.1 mm.; minima 14.0×11.2 and 15.0×10.5 mm.

Æthopyga sanguinipecta.

THE BLACK-THROATED SUNBIRD.

(1273) *Æthopyga sanguinipecta sanguinipecta* Walden.

THE BURMESE BLACK-THROATED SUNBIRD.

Æthopyga sanguinipecta sanguinipecta, Fauna B. I., Birds, 2nd ed. vol. iii, p. 390.

Except that the habitat of this and the preceding bird overlaps in Yunnan and possibly the Northern Shan States, they might be considered to be races of the same species.

The present form is found in Burma from the Southern Shan States through the Karen Hills as far South as Muleyit. It has

also been often obtained in Yunnan, whence Forrest sent three specimens of *saturata*.

Judge S. M. Robinson is the only collector who has taken the nest and eggs of this bird. He writes (Journ. Bomb. Nat. Hist. Soc. vol. xxix, p. 1053, 1924):—"Nest. Pear-shaped, entrance two-thirds of the way up with only a bare suggestion of a porch. It was composed of dry grass-stems lined heavily with silky white grass-down and decorated outside all over with chips of dead wood, bits of dead bamboo and bamboo-leaf. It was suspended from the end of a wild-raspberry stem. The eggs are dull white spotted all over with greeny-brown spots which are thickest at the larger end, where they run into each other and form a circle. The eggs measure .69 by .48 in."

They were taken at Thandoung in the Karen Hills, East of Toungoo, on 20th April, 1923.

Æthopyga nipalensis.

THE NEPAL YELLOW-BACKED SUNBIRD.

(1274) *Æthopyga nipalensis nipalensis* Hodgs.

THE NEPAL YELLOW-BACKED SUNBIRD.

Æthopyga nipalensis nipalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 391.

This Sunbird is found in Eastern Nepal and then Eastwards throughout the Himalayas and hills South of Assam to the Kauri-Kachin Hills and Shan States.

Jerdon's account of this bird's nest and eggs is undoubtedly wrong, for no Sunbird ever laid eggs of a dusky-greenish tinge.

Hodgson's account is more possible and may really refer to this bird. According to him this Sunbird "builds a comparatively large oval hanging nest (composed of moss and wool, and lined throughout with silky down), which is attached to some leafy twig at an elevation of from 3 to 5 feet from the ground. These birds, it is said, frequent groves and open forest, in which also their nests are always found. The nest is egg-shaped, 7.75 inches in length by 4 in breadth, and a little above the middle is an oval aperture about 1.62 by 1 inch. There is no portico or projection above this. They lay two or three eggs, which are figured as moderately broad ovals 0.68 by 0.43 inch (=17.3×11.4 mm.). The eggs are represented as nearly white, with a certain amount of reddish mottling towards the large end. They have only one brood in the year, and both birds participate in rearing the young, which are ready to fly in July."

In 1902 Osmaston obtained a nest of this Sunbird which he describes (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 816, 1903) as follows:—"A nest found by me on the 14th May, 1902, at

Rungiram, elevation 6,200 feet, near Darjeeling. The nest is oval in shape, measuring externally $5\frac{1}{2}$ " by $2\frac{1}{2}$ ". It was suspended from the ends of a small *Cryptomeria* branchlet, overhanging a steep bank at a height of about 3 feet from the ground, and is composed of bright green moss with a little white vegetable down woven in, and is lined with the latter material.

"The aperture, which is 1 inch in diameter, is near the top. There is no 'projecting' roof over the entrance.

"The eggs, three in number, are white, sparingly spotted and mottled with very dark brown.

"The average of the three eggs is $.58" \times .41"$ ($=15.7 \times 10.9$ mm.).

Later Osmaston took several nests of this bird agreeing well with the description given by him for the first nest, these being found either in scrub-jungle or on the outskirts of jungle attached to low shrubs, 2 to 4 feet from the ground, and at elevations between 6,500 and 7,500 feet. The eggs in four other clutches taken by Osmaston are all pure white.

A nest, with young, found by myself, and another brought to me with three eggs and both parents, are bigger than those described by Osmaston, though similar in shape and material, except that with the moss were mixed roots, fibre and chips of leaves. The eggs, however, are not I believe those of a Sunbird, though the nest brought with the birds is correct. They may be the eggs of a *Chalcites*. They are white, mottled at the larger end with reddish-brown, very sparse everywhere except in broad rings. They measure up to 16.9×12.7 mm. and, though the bulk is no greater than in the eggs taken by Hodgson, they seem much too big to be those of the Sunbird.

Osmaston found two eggs only in every nest but the first, in which he found three. They are rather long, pointed ovals, close but dull texture and very fragile.

Eleven eggs, omitting mine, average 15.3×10.8 mm.: maxima 16.0×11.0 and 15.5×11.3 mm.; minima 14.8×10.4 and 15.1×10.3 mm.

(1277) *Leptocoma lotenia* (Linn.).

THE MAROON-BREADED SUNBIRD.

Leptocoma lotenia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 394.

Loten's Sunbird, by which name this species has hitherto been known, is found in Southern India South of a line drawn roughly from Ratnagiri on the West, through the centre of the Deccan, East to Northern Madras. It is also found over the greater part of Ceylon. In the hills of Southern India it occurs up to about 5,000 feet and in Ceylon up to about 3,000 feet.

It is resident wherever found and breeds both in thin forest, scrub- and other jungle, and also in gardens and bushes in and around villages. Curiously enough the only account of the nesting

of this common bird in Hume's 'Nests and Eggs' is that of E. H. Aitken, who obtained a nest in his garden on the island of Karanja in October containing one egg and one young bird.

Since then many collectors have observed it breeding, and its nests and eggs are well known. In Southern India the nest is normally a domed affair, which may be pear-shaped, oval or round, made of grass, moss, lichen, small leaves, roots etc. and lined with vegetable-down or wool, these two last often being incorporated in the body of the nest as well. Occasionally the lining is of grass-seed down. The materials are usually very roughly put together, but there is always a porch of some kind over the entrance which is placed near the top of the nest. The whole affair is most untidy and gives one the impression of having been hurriedly thrown together by the birds, but the result is that they look so much like little collections of rubbish caught in a branch that they escape further attention. The outside is decorated with all kinds of oddments, untidily attached and often hanging inches below the nest. This is, more often than not, pendent or semipendent, but at other times is wedged in between twigs or creepers. Most nests in Southern India are placed in small bushes between 2 and 5 feet from the ground; others are built in trellis-work round verandahs or made as arches for garden-flowers to trail over, while in Travancore Stewart found them very partial to Hibiscus hedges. The nest may measure as much as 10 inches long, like that found by Aitken, but most will be found to be about 6 by 6 inches, though the untidy decorations may stick out for inches more around and below.

In Ceylon Wait says ('Birds of Ceylon,' 2nd ed. p. 146, 1931) :—
 "The nest is usually not the little hanging structure made by most species, but is placed in the large, flocculent masses of cobweb spun in low bushes by a certain species of spider. In the interior of the mass the birds press out a more or less globular chamber, lining the walls with vegetable down, and generally providing a little eave of cobweb over the entrance, which is at one side. If spiders' webs are not available, they appear on occasions to construct a little pear-shaped hanging structure like that of the next species."

The breeding season is principally from January to April, but Davidson found eggs in Karwar as late as the 6th August, while Bourdillon and Stewart say that in Travancore they breed on into May. In Ceylon the principal breeding months are February and May.

The number of eggs laid is almost invariably two only, though Cardew took one nest with three in the Nilgiris and Wait one with three in Ceylon.

The eggs are very like those of the still better known *Leptocoma asiatica* but, as a series, are more unicoloured. The most common type has the ground very pale grey, rarely tinged with green or

dull buff. The whole surface is profusely speckled with tiny marks of darker grey, which are still more numerous at the larger end, where they sometimes form rings or caps; these eggs look as if unicoloured except for the darker caps. Other eggs have the freckles larger and rather better defined, showing the ground below. A clutch of three given me by Cardew has the ground yellowish-white richly blotched all over with light brown; another pair has the ground reddish-pink almost obliterated with darker red-brown blotches, small and rather longitudinal in character. Yet another pair is almost pure white, faintly freckled with light reddish at the big ends.

In shape the eggs are long ovals, often decidedly pointed at the small end. The texture is fine but not very close and the surface is dull or very faintly glossed.

Fifty eggs average 17.0×12.0 mm. : maxima 18.1×12.0 and 17.1×12.4 mm. ; minima 15.9×11.6 and 16.3×11.2 mm.

Leptocoma asiatica.

THE PURPLE SUNBIRD.

(1278) **Leptocoma asiatica asiatica** (Lath.).

THE INDIAN PURPLE SUNBIRD.

Leptocoma asiatica asiatica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 396.

This pretty little bird is one of the best known of our Indian avifauna, being found over the whole of India excluding Sind and the North-West Provinces and extreme Eastern Bengal and Assam. It is equally common all over the plains and on the hills of Southern India to their summits, while in the Himalayas they breed commonly up to 5,000 feet and less often up to 7,000 feet. It is a bird of civilization, frequenting gardens, parks, the surroundings of towns and villages and even the verandahs of inhabited houses. On the other hand, some birds may be found breeding in forest and scrub-jungle and in the cane-brakes and swamps of the Himalayan Terai. In the jungle, however, it is a shy rare bird, while in gardens it is one of the most common and familiar.

As regards its nest, it is difficult to find anything not included in Hume's exhaustive account. He writes :—"The nest is pendent and composed of *all kinds* of materials beautifully woven together with the silkiest fibres and cobwebs; hair, fine grass, pieces of decayed wood, lichens, rags, thorns, etc. are all pressed into the service. The body of the nest is oval, generally, with all sorts of little pendent pieces of wood etc. hanging below, as ornaments apparently, while the apex of the oval is prolonged into a cone meeting the point of support. A little above the centre of the oval a small circular aperture is worked, and just above it a projecting

cornice, 1 to 1½ inches wide, is extended; then on the opposite side of the oval, the wall of the nest, which is ready some days before the eggs are laid, is pushed out or bulged out a little so as to give room for the sitting bird's tail. The hulging out of the back of the nest is one of the last portions of the work, and the female may be seen going in and out, trying the fit, over and over again. When sitting, the little head is just peeping out of the hole under the awning. I remember seeing a nest suspended to a punkah-cane, which was stretched across Brook's verandah at Etawah. This nest was founded on two or three strips of gun rag which had been left hanging across the cane, black and smelling of gunpowder. Yet with these unpromising materials and plenty of silky grass etc. it made a pretty little pendent home.

"As regards the portico, this, though general, is not universal, and I have seen many nests in which it was entirely wanting."

Curious nests are often met with. Adam speaks of one ornamented outside with all sorts of feathers, while, in another nest, Rhodes Morgan found that bits of blotting paper, twine and old service stamps adorned the exterior walls. I have myself seen a nest which externally was composed almost entirely of very small scraps of white calico, cotton and flannel, taken from a verandah where a native tailor sat daily at his work. Many nests, also, are attached to spiders' webs, or the webs are made use of to such an extent to bind the various materials together that they appear to be mostly web.

The site chosen for the nest varies greatly. Normally the nest is built pendent to a small drooping twig of a bush between 18 inches and 5 feet from the ground. I have been told of nests in Banyan- and Popul-trees 20 feet from the ground, and once saw one in a Casuarina-tree on the banks of the Hoogli quite as high as this. Above all, however, the little birds love bushes in gardens, arbours, flower-arches, trellis-work over verandahs and even the insides of verandahs where suitable places exist on which to hang the nests; occasionally they are even built in long grass, and I have seen a nest attached to two or three stems of Pampas-grass. Bushes round tanks seem to be specially favoured, and in such places I have several times seen hornets' nests and Sunbirds' nests on the same bush and within a very few inches of one another.

It is difficult to say what constitutes the principal breeding season for this little bird but probably in the plains there are two main periods, March and April before the Rains break and then the end of June, after they have broken, to the end of August. In the hills they breed from the middle of April to the end of June, those birds which have second broods laying as late as the end of July.

In the plains, however, eggs may be found in every month of the year and most birds have two broods and many have three. These they bring up all in the same nest unless it gets worn out and too damaged for further use.

The eggs number two or three in a clutch and I have no record of four.

In appearance they are like those of the preceding species but the markings are rather larger, consisting of definite freckles and tiny blotches, and unicoloured eggs are quite exceptional. The most common type is one with a grey ground, almost white, with numerous little blotches of darker grey over the whole surface and still more numerous at the larger end, where they often form rings or caps. The next most common is a type with the markings more brown but otherwise similar.

One hundred eggs average 16.3×11.6 mm.: maxima 19.3×12.4 mm. (Blewitt); minima 14.1×11.0 and 15.1×10.9 mm. My own measurements give the maxima as 17.9×11.8 and 16.9×12.3 mm. Perhaps that measured by Blewitt was a double-yolked egg.

(1279) *Leptocoma asiatica intermedia* Hume.

THE BURMESE PURPLE SUNBIRD.

Leptocoma asiatica intermedia, Fauna B. I., Birds, 2nd ed. vol. iii, p. 398.

This race of the Purple Honeysucker extends from the districts East of Bengal and Southern Assam, Manipur and the Chin Hills South throughout the plains of Burma to Tenasserim and East to the Shan States and Karenni.

It is resident wherever found but nowhere seems to occur in the same numbers as does its cousin in India. As to its nidification, there is nothing to differentiate it from that of the preceding bird. Its nest is the same untidy little pear-shaped affair and is made of the same miscellaneous materials and placed in very similar positions. In Silchar the bird was not rare in gardens in the station, breeding in them and almost invariably building its nest in among creepers growing over trellis-work arches. In the Upper and Lower Chindwin Hopwood and Macdonald took many nests, but here the birds often placed them in thorny bushes, generally hanging them from an outer pendent twig.

It occurs in most of the hill ranges up to 4,000 feet and exceptionally up to 5,000 feet.

Their principal breeding month is April. Hopwood, Mackenzie and Macdonald took them in this month in the Upper and Lower Chindwin, in Arakan and in Tenasserim. In April also Livesey obtained its nest in the Southern Shan States, while in Assam April was also the favourite month. I, however, took eggs in May and, as I saw young almost able to fly in the second week of April, it must sometimes lay in March, while I have heard of a nest containing eggs on the 18th June in Silchar.

The eggs number two or three and are in all respects like those of *L. a. asiatica*, the same long ovals in shape and with the same dull texture and fragile shells.

Thirty-five eggs average 15.9×11.5 mm.; maxima 18.1×12.5 mm.; minima 14.2×11.0 and 15.3×10.8 mm.

I have seen both sexes actively engaged in building and the male not only brings much of the material for the nest but also sometimes places it in position. I do not think he ever incubates.

(1280) *Leptocoma asiatica brevirostris* (Blanf.).

THE SIND PURPLE SUNBIRD.

Leptocoma asiatica brevirostris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 399.

The Sind Purple Sunbird is found over the North-West Frontier Province through Baluchistan and Afghanistan to Persia, and South to Sind and the districts East of the Persian Gulf. Ticehurst thinks that the bird is locally migrant in Sind, and Eates, in *epistola*, remarks that "these little Sunbirds leave Upper Sind in October, before which month they collect in flocks, sometimes numbering as many as forty or fifty, and return in March and April, but then *not* in flocks."

The nest resembles that of the other races of Purple Sunbird. They also build in similar situations but also very often in small Babool and other trees, well above the ground and, consequently, are rather conspicuous when once one realizes that the nest looks very much like a small ball of rubbish and cobwebs. It probably has a regular porch over the entrance more often than is usual with this species, and Pitman, Ratray and Williams all constantly refer to this feature as present in the nests taken by them.

The breeding season seems universally to be April, extending into May occasionally, while round Karachi, in Sind, as many birds lay in May as in April.

The number of eggs laid is two or three and they are indistinguishable from those of the other Purple Sunbirds. Among abnormally coloured eggs I have one pair which are pure white except for small brown caps at the extreme larger end.

Thirty eggs average 16.7×11.65 mm.; maxima 17.9×11.8 and 17.8×12.1 mm.; minima 15.8×11.7 and 15.9×10.9 mm.

(1281) *Leptocoma brasiliiana* Gmelin.

THE YELLOW-BELLIED, or VAN HASSELT'S, SUNBIRD.

Leptocoma brasiliiana, Fauna B. I., Birds, 2nd ed. vol. iii, p. 400.

Although spread over a great area, this Sunbird appears to be rare everywhere except in the South of Burma. It occurs, though in very small numbers, in extreme East and South Assam. Thence it is found in Tippera, Chittagong, Manipur and the whole of Burma South to the Malay States, Java, Sumatra and Borneo.

It is a bird of the plains, not ascending the hills. On the rare occasions we found it in Cachar or Dibrugarh it was always in dense cover in swampy land.

In Hume's 'Nests and Eggs' there is only one note referring to this bird, evidently part of what had been a fuller note, as it is without name, date, or locality. It runs:—"I found this nest five days ago, building, and this morning was fortunate enough to find the bird on the nest and two fresh eggs. I waited for nearly an hour, then saw the female on the nest, flushed, and shot her. The cock came fluttering about the nest about 5 minutes after, and I shot him. The nest was on the end of a bough of a tree in jungle, 3 feet from the ground—the ordinary nest of this kind of bird, but built entirely of shelled bark and cobwebs (the bark of the colour of light brown paper) and lined with very fine grass, 5 inches in length and $2\frac{1}{2}$ in diameter. The entrance-hole $\frac{3}{4}$ in diameter. The nest at ten paces distant is very hard to make out, looking like a bunch of dried leaves. There was no tail or ornamentations."

Hume describes the same nest as a "lovely little felted purse, composed of the glistening red-brown scales taken from the basal portion of the stems of ferns, densely felted together, and exteriorly very thinly coated with excessively fine black moss-roots and white silk from cocoons, tiny pieces of moss and lichen being laid in here and there with this slender fibrous covering, apparently for ornament. The nest has no dependent tags or streamers."

The two descriptions do not seem to agree. Hume then describes the eggs as "tiny little ovals, a little elongated and with a slight pyriform tendency. The shell, though very fine, decidedly stout for the bird, and with a perceptible amount of gloss. The colour is a sort of brown *café-au-lait*, and round the large end is a dusky greyish mottled zone, not very markedly darker than the ground-colour. The two eggs measure .58 by .41 and .57 by .4 respectively" (= 14.7×10.4 and 14.5×10.2 mm.).

T. Horsing, who has taken five nests of this species in Java, describes them as "round and ball-like with an entrance on one side with an overhanging shelter. It is nicely made of small grass-pieces, lined inside with hair and small feathers and decorated outside with Kapok (cotton-down) pieces, tree-moss and hair. Placed in a coffee-bush about 6 feet up."

The eggs, two in number, are white, with dots, and lines of black and deep purple at the larger end, with underlying clouds of pale grey. Two eggs sent me measure 17.5×12.6 and 17.2×12.6 mm.

Neither nest nor eggs are anything like those described by Hume, and his identification was probably wrong or the papers had got mixed up.

Leptocoma jugularis*.**THE YELLOW-BREASTED SUNBIRD.**(1282) **Leptocoma jugularis procelia** Oberholser.**THE NICOBAR YELLOW-BREASTED SUNBIRD.***Leptocoma ornata ornata*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 401.*Leptocoma pectoralis procelia*, ibid. vol. viii, p. 666.

Oberholser restricts this race of Yellow-breasted Sunbirds to the Nicobars.

Davison, in Hume's 'Nests and Eggs,' thus records its nesting:—"Although I found several nests of this species, I never obtained the eggs. On the 10th January I found a nest at Camorta; I shot both the birds, but on climbing up to the nest I found it empty. Again, on the 17th February, I found three nests, two empty, one with two very young birds."

Hume describes the nest as "very similar to, but larger and more coarsely made than, that of *A. asiatica*. The nest is a pendent elongated egg, a good deal drawn out towards the twig it hangs from, 9 inches in length and 3 in diameter, composed chiefly of dry grass and cocoanut fibre, with a few feathers intermingled in the body of the nest and the interior thickly lined with these. About an inch below the point of suspension the portico projects for 1.25 inch; it is about 1.5 thick; and below this is the little oval entrance to the nest, about 1.25 by 1 inch. Interiorly the cavity is about 3.5 inches deep, and below the lower margin of the entrance hole nearly 1.75 in diameter. The portico and the upper portion of neck is nearly all of coir, while the lower and broader portions are mostly grass and pieces of bamboo sheaths, a dead leaf or so and a scrap or two of bark. There is no attempt to decorate the nest exteriorly."

The nests are sometimes placed at considerable heights from the ground. Davison had to "climb" to the nest he found, while Anderson took one 10 feet up in a tree. Osmaston, on the other hand, took a nest 3 feet from the ground, attached to a twig of a climber.

De Roepstorff took one egg of this species in February, Anderson some clutches in the Nicobars in January and Osmaston a clutch of three eggs on the 24th March in Car Nicobar. The breeding season, therefore, would seem to be from January to March.

The full clutch of eggs numbers two or three. In appearance they much resemble those of the various races of *Leptocoma anatica*, but instead of being freckled uniformly are much blotched and

* Several races of *pectoralis* (= *ornata*) have been described by Oberholser (Journ. Wash. Acad. Sci. vol. xiii (2), p. 230, June 1923). Of these *L. p. procelia* is the Nicobar bird, *L. p. heliobleta* the Malay bird, and *L. p. blanfordi* the Kondoï bird. *Pectoralis* itself, again, is only a race of *jugularis*.

clouded with sienna-brown or dark brown with pale secondary clouds of grey. In my own collection I have one clutch with a pale dull grey-green ground, one with a pale clay and one with pale stone-grey ground-colour.

Ten eggs average 15.9×11.2 mm.: maxima 17.0×12.1 mm.; minima 14.8×11.0 and 15.5×10.7 mm.

(1282 a) *Leptocoma jugularis heliobleta* Oberholser.

THE MALAY YELLOW-BREASTED SUNBIRD.

Leptocoma ornata ornata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 401 (part.).
Leptocoma ornata heliobleta Oberholser, Journ. Wash. Acad. Sci. vol. xiii (2), p. 230, 1923.

This form of Yellow-breasted Sunbird is found in Tenasserim and the Malay States.

There is no record of the breeding of this Sunbird, but Kuschel received two clutches of eggs from the Federated Malay States, of which he sent me one of three.

These eggs are exactly like a pair of eggs I possess of the preceding race—a pale sienna ground with darker clouds of brown and secondary clouds of sienna-grey, with a few deeper spots of very dark brown.

They measure 15.5×11.3 , 15.2×11.2 and 14.8×11.1 mm.

Leptocoma flammaxillaris.

THE MAROON-BREASTED SUNBIRD.

(1284) *Leptocoma flammaxillaris flammaxillaris* (Blyth).

THE BURMESE MAROON-BREASTED SUNBIRD.

Leptocoma flammaxillaris flammaxillaris, Fauna B. I., Birds, 2nd ed. vol. iii, p. 403.

This bird, which may be called the Maroon-breasted Sunbird, from its very conspicuously maroon-banded underparts, quite unlike those of the *jugularis* group, is found over the greater part of Burma from Arakan on the West to the extreme South of Burma and into the Malay States. On the East it is found in Siam and Cochin China.

These Sunbirds frequent gardens, orchards, open country round villages and, less often, open glades and the outskirts of thin forest or thin scrub-jungle.

Oates found this Sunbird breeding in Pegu, and says:—"All the nests I have met with have been placed in secondary jungle on shrubs and bamboos, seldom more than four feet, occasionally only two, and in one instance about six feet from the ground.

"The nest is generally pear-shaped, the upper part tapering up to the point of attachment. Occasionally the shape is more that of a long cylinder. The total length varies from 6 to 8 inches and it is 3 at its widest part. The entrance, $1\frac{1}{2}$ by 1, is centrally situated and is overhung by a rude porch, an inch wide and about $1\frac{1}{2}$ long. The walls are half an inch thick, but at the base fully an inch.

"The materials are chiefly fine grasses mixed up with scraps of dead leaves, moss, bark and cobwebs. The interior is entirely of very fine grass, and the egg-chamber has usually a few feathers in it. Pieces of bark are suspended from the nest by cobwebs, occasionally extending a foot down."

Darling obtained a similar nest hut suspended from a thin bough of a tall bush 10 feet from the ground, while a second was attached to a bamboo at the same height.

Herbert, who took a wonderful series of the eggs in Siam, says that they usually place their nests 10 to 20 feet up in the outer boughs of trees but that he has also taken one 2 feet from the ground in a hush. The nests he describes as similar to those found by Oates, giving a beautiful photo of one in the 'Journal of the Siam Natural History Society' (vol. vi, plate 15).

In Burma the birds seem to have two nesting seasons, January to March and again July and August, but in Siam, where the bird is extremely common, Herbert says: "The nesting season is almost continuous throughout the year, and I have records for every month. Nests are plentiful by early February, and continue as freely up to the end of August; a fair number may be found in January and September, and occasional ones in other months."

The number of eggs laid is invariably two and I have no record of three.

Herbert describes the eggs well:—"The eggs are moderate ovals in form and are often considerably pointed towards one end. In colouring there are two extremes with numerous variations between them. One type has the whole surface closely freckled with yellowish- or greenish-brown, more dense at the large end, the greenish-white ground-colour being only discernible at the smaller end. There are generally a few scattered black specks or hair-lines to be seen on these eggs, though they are not always present. The other type has a greenish- or yellowish-white ground-colour, which is clouded or thickly speckled about the large end with a purplish hue, often forming an irregular zone, and on this there are blurred spots of a dark purplish-brown."

To this I can merely add that a few eggs have the blotches and clouds almost entirely confined to the larger end, where they form dense caps.

Thirty-eight eggs average 15.4×11.1 mm.; maxima 16.2×11.8 and 16.1×12.0 mm.; minima 14.4×10.9 and 16.0×10.5 mm.

The nests are built in a very short time. Oates records that "on the 3rd July I observed a female attaching a piece of grass to a twig. On the 8th the nest looked quite finished, and on the 14th I took two eggs from it."

(1285) *Leptocoma flammixillaris andamanica* (Hume).

THE ANDAMAN MAROON-BREASTED SUNBIRD.

Leptocoma flammixillaris andamanica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 404.

This little Sunbird is found in the Andamans only, frequenting and breeding both in the thick forest and scrub and also in bushes etc. in gardens and the open country round Port Blair.

Captain Wimberley was the first person to take the nest and eggs of this bird at Aherdeen. The nest taken by him, one described by Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xii, p. 559, 1890) and many taken later by him and by Wickham and Anderson were all very much alike, but the situations in which they were placed varied greatly. Most nests were attached to slender twigs of small trees or high bushes in thin forest, scrub, or actually in the gardens of the station. The height at which they are suspended above the ground may be anything from 2 to 10 feet, but is most often between 3 and 5. Several nests taken by Wickham and Osmaston were attached to roots under overhanging banks in forest, very similar positions to those chosen by *Æthopyga seheriæ*. One was attached to a tuft of coarse grass hanging down under one of these banks and another to a mass of creepers. Osmaston writes of one nest taken with two fresh eggs at Gopla Kabung on the 30th May:—"It was suspended over the surface of a stream, about 3 feet above the water, which was 8 or 9 feet deep, so that I had to swim out and tread water while taking the nest."

The nests are like those of *Leptocoma asiatica*, but smaller and neater, while they are very seldom of the very long purse-shape generally adopted by the preceding bird. The nest taken at Gopla Kabung measured about 4 inches by 3, and this seems to be just about an average-sized nest; some are a little bigger and some a little longer in proportion to the breadth while, occasionally, one may be almost round. Many have odds and ends hanging about and below the nest, sometimes in quite a tail, which add considerably to the rough outside length of the nest, while all have a small, very loosely made portico over the entrance.

The body of the nest is generally composed chiefly of fine grasses but, mixed with these, is an assortment of all kinds of other things, such as fibres of many kinds, roots, bits of leaves, bark, caterpillar excretæ, spiders' egg-bags, bits of moss and lichen, flowering heads of grass etc., etc. There are always also many cobwebs used both

in the body of the nest and together with the materials which attach it to its support. They seem invariably to be pendent, and there is no record of their being built in among cobwebs or in upright forks or twigs of bushes.

The portico, which is very roughly constructed, consists, in four out of five nests, almost entirely of the flowering ends of grasses, mixed with just a few flakes of bark or some similar material. The lining varies greatly; often it is of fine grass but, at other times, cotton-down, flowering grass ends, soft fibrous bark, or a few soft feathers are also used.

The breeding season lasts from early March to the middle of June and I have eggs taken from the 1st of the former and on the 10th of the latter month. Occasionally they may also breed in other months, as Osmaston obtained one nest with two eggs on the 28th October. A full clutch consists of two eggs only. Wickham obtained one clutch of three out of eight nests found, while Osmaston, in a much greater number, found none.

The eggs vary greatly. The ground ranges from a very pale greyish-white, yellowish-white or creamy-white to a pale but distinct brown. The markings consist of cloudings of brown of many shades, differing much in different eggs. In most they are mottled over the whole surface of the eggs, mixed sometimes with paler grey secondary clouds; more rarely they are confined to the larger end. Above these clouds many eggs are boldly spotted with deep purple-black, the spots often paler and redder at the edges and looking as if the spots had run. In a few eggs the spots are very bold and the cloudings absent or nearly so.

Among abnormally coloured eggs in the wonderful series taken by Osmaston there is one pair which is pure white, faintly freckled with grey at the extremity of the larger end. Another pair is very densely marked with reddish-brown, while yet a third is white, lightly mottled here and there with grey-sienna.

In shape the eggs vary from stout broad ovals to long narrow ovals, often much pointed at the smaller end. As a whole, however, the long ovals greatly predominate. The texture is fine and close but glossless, and the shell very fragile.

Forty-six eggs average 16.6×11.5 mm.: maxima 18.0×11.8 and 17.2×12.0 mm.; minima 15.0×11.7 and 17.0×10.7 mm.

(1286) *Leptocoma minima* (Sykes).

THE SMALL SUNBIRD.

Leptocoma minima, Fauna B. I., Birds, 2nd ed. vol. iii, p. 405.

The Small Sunbird occurs and is resident in Western India from about the latitude of Bombay, in the Bombay Presidency, South to Travancore and Ceylon; it also occurs in the North-West Province, where, however, it is a rare bird.

It frequents thin and evergreen-forest, scrub, secondary growth and gardens, though I have never heard of it breeding in the last-mentioned. It is found alike in the plains and low hills, while in the Nilgiris and other hills of South India it ascends as high as 5,000 feet, though probably not very often.

In Hume's 'Nests and Eggs' there are two notes on the breeding of this bird—Davison's, which is undoubtedly wrong, and Bourdillon's, which is correct; but the latter's note is very meagre, only referring to "a hanging nest at the extreme end of a gamboge bough found by Ferguson." Later Bourdillon took nests himself and sent me two sets of eggs taken by him in Travancore. Davidson and Bell took many nests and eggs in Kanara, the former having a note on the bird and its nest (Journ. Bomb. Nat. Hist. Soc. vol. xi, p. 675, 1898) which reads:—"This lovely little bird is intensely common in all the forests below the Ghâts, along the Ghâts, and in the central part of the district, but absent from Halyal, Mundgoda, and the extreme East. It breeds from December to April, making its nest at low elevations, nine out of every ten I have found being within five feet of the ground. By far the largest number of nests I have seen have been built on the tops of stems of Karwe (*Strobilanthes*), placed either on the sides of roads or in forest. The nests are very small and neat hanging balls of bright green moss and white lichens, and are easily distinguishable from those of any other Sunbird of Western India. The eggs are two; white closely mottled with fine spots of purplish-red, and in no way resembling those of *A. asiatica* or *A. zeylonica*. I must have taken much over fifty nests, so there can be no doubt as to the coloration of the eggs at least in Kanara."

Other nests taken by Bell, Bourdillon and others closely resemble those described by Davidson and apparently measure about 4 by 3 inches. One nest taken by Bourdillon was externally composed entirely of lichen and cobwebs.

The breeding season in Ceylon and Travancore is February, March and April and in Kanara December to April. In the Nilgiris it breeds in September and October, in which months Howard Campbell found nests both empty and with young.

The eggs, always two in number, are far more like those of the genus *Æthopyga* than those of *Leptocoma asiatica*. The ground is white with a dense ring of dark reddish spots round the larger end and very few reddish specks elsewhere. I have many of the eggs taken by Davidson, and all are like this except one pair which answers to his description "mottled with reddish." The secondary markings, hardly visible, consist of specks and freckles of very pale lilac-grey. In shape the eggs are broad ovals, generally blunt, occasionally rather pointed. The texture is fine but not very close, glossless and very fragile.

Twenty eggs average 14.0×10.2 mm. : maxima 14.5×10.4 mm. ; minima 13.5×9.9 mm.

(1287) *Leptocoma zeylonica* (Linn.).

THE PURPLE-RUMPED SUNBIRD.

Leptocoma zeylonica, Fauna B. I., Birds, 2nd ed. vol. iii, p. 400.

I have nothing to add to the distribution of this Sunbird as given in the 'Fauna,' but the results of the Vernay Expedition may give us further information as to its distribution in the South-East of India. In the 'Fauna' I wrote:—"Ceylon; India North to Bombay, throughout the Central Provinces and thence East to Chota Nagpur and, commonly, as far East as Burdwan and, rarely, to Calcutta, where I have seen it. It is common in Dacca and Faridpore and is said to occur in Assam, though I never met with it during my 30 years' residence in that Province. Inglis did not obtain it in Cachar nor did Primrose in Goalpara. It does not occur in Bihar."

This is just as familiar and confiding a little bird throughout its range as is the Purple Sunbird, and may be found breeding freely in gardens, parks and the surroundings of villages, while it also affects thin forest and scrub, more especially deciduous Sal-forest.

The nests may be built in almost any position, but generally, as Hume says, "they are attached to the terminal twigs of branches, at heights at from 10 to 30 feet from the ground."

In spite of the great number of notes received by Hume on the nests of this bird, there is very little showing any variation in sites. Among my own notes are, however, many which amplify his and show that the nests are often taken from sites quite low down. Thus Williams, around Wellington, took them low down in Orange-trees, *Lantana*-bushes etc., not more than 4 feet from the ground. MacArthur took them in the Bilaspur district in bushes 3 feet from the ground; Stewart in Travancore, Phillips in Ceylon and Vidal in Poona also took them low down in bushes and garden-shrubs. Nor are they always built in trees and bushes. I have records of nests built in creepers, on trees and on trellis of verandahs, while Betham at Poona found a nest built on wire-netting in a greenhouse.

The nest itself is just a rather neat replica of that of *Leptocoma asiatica*. It may be pear-shaped, almost round, oval or a very long purse. Most nests, however, are blunt pear-shaped or broad ovals, the vertical being the longer measurement. Nests measure roughly somewhere between 5 by 3 inches and 6 by 4 inches, though loose ends of materials may much increase these measurements, while occasionally a nest may be still smaller and more compact.

Beavan gives the measurements of a long oval nest as 6 by 2½ inches.

Most nests, but by no means all, have a portico or porch over the entrance, made of the same materials as the rest of the nest. These consist largely of grass and various fibrous materials, which are mixed with as great a variety of oddments as are the nests of the Purple Sunbirds. The lining seems to be nearly always of very soft vegetable-down of some kind, well felted together or, at other times, of soft feathers. Most nests are decorated outside with such items as bits of bark, lichen, moss, broken leaf etc., all fastened on to the nest with cobwebs but not, as a rule, in the profusion loved by the Purple Sunbird, some nests having very little indeed.

The breeding season commences on the 1st January and finishes on the 31st December, but there are certain periods of increased breeding activity. In Bengal more eggs are laid from March to May than in other months of the year. In the Bombay Presidency, about Poona, many birds breed in February and March and again in June to August; in Kanara, also, most breed in February, March and April, but a great many others in August and September. In Bangalore April to June seem to be the chief months, in Travancore February to April, while in Ceylon the birds breed continuously from February to August and casually in September to January.

The eggs, nearly always two in number and only very exceptionally three, cannot be distinguished from those of the Purple Sunbird, but are even more varied in coloration and character. Taking them as a whole one is struck, first, by the few apparently unicoloured eggs, nearly all being sufficiently definitely freckled or blotched to show the ground-colour; secondly, by the large proportion of eggs with a well-defined ring about the larger end, while the rest of the egg is but scantily marked. Among the types worthy of special note are the following:—(1) apparently uniform umber-brown, with a deeper tinted ring round the larger end; (2) pale sea-green mottled with brown and grey; (3) very pale sea-green, faintly freckled or smudged with pale grey; (4) eggs with the ground-colour pale sea-green, pale grey-green or pinkish-brown, with bold, dark rings round the larger end and almost spotless elsewhere.

In shape the eggs vary greatly, long ovals perhaps predominating. The texture is fairly close and fine but the surface glossless and the shell fragile.

One hundred eggs average 16.4×11.8 mm.; maxima 18.1×12.0 and 17.0×12.7 mm.; minima 14.4×11.2 and 14.9×11.0 mm.

Anthreptes nuchalis.**THE BANDED SUNBIRD.**(1288) **Anthreptes nuchalis nuchalis** Blyth.**THE SUMATRAN BANDED SUNBIRD.***Anthreptes hypogrammica hypogrammica*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 408.*Anthreptes nuchalis nuchalis*, *ibid.* vol. viii, p. 667.

From Sumatra, the type-locality, this Sunbird extends North into Arakan and East into Borneo. Its extreme Northern limit seems to be Akyab, while it is not uncommon in parts of Western Burma and Tenasserim.

Its breeding haunts are not yet known, but are probably in thin forest, scrub and gardens. The only nest of which I have any record is one taken by Moulton near Sarawak on the 15th August. It was attached to the end of a leaf of a Betel-palm over 20 feet from the ground and in general appearance was like many nests of the Purple Sunbird, though there was no porch over the entrance. It was made of scraps of bark, lichen, dried moss, leaves and fibre bound together with cobwebs and adorned with the usual miscellaneous collection of bits, untidily attached with spiders' webs, with a lining of seed-down. It measured about 8 inches long by about 4 to 5 wide. The two eggs are pale lilac-grey with a few blotches and many scriggly lines of purple-black, mostly confined to a broad indefinite ring at the larger end; the secondary spots are of pale lavender and grey.

The two eggs measure 18.0×13.0 and 18.0×13.2 mm., and may prove to be unusually large.

Anthreptes malacensis.**THE BROWN-THROATED SUNBIRD.**(1289) **Anthreptes malacensis malacensis** (Scop.).**THE MALACCAN BROWN-THROATED SUNBIRD.***Anthreptes malacensis malacensis*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 409.

This Sunbird has been obtained in Arakan and is common in Tenasserim, and thence extends South to Sumatra, Borneo and Java. East it is common in Siam and Annam.

It is a bird of forest, scrub, secondary growth, bamboo-jungle and of gardens, parks and villages, and is extremely common in the gardens and orchards of Siam.

The nest was first taken in Taiping by W. A. T. Kellow, and later Williamson and Herbert found it breeding very numerous in Siam. Within our limits it has not yet been obtained breeding, though it undoubtedly does so wherever found.

In the 'Journal of the Siam Natural History Society' (vol. vi, pl. xvi) Herbert gives the following account of its nidification:—
 "This Sunbird may also be seen in the larger compounds, but its favourite resort is the fruit-gardens, where it is resident and plentiful.

"The nest is secured to one of the outer branches of a tree or shrub or, not infrequently, to the flower-stems of a Betel-palm at about 30 feet from the ground. It is a simple pear-shaped structure, with a thick pad forming a portico over the entrance. The general appearance of the nest is rough owing to the coarse pieces of fibre attached to the outside, but the interior is neatly woven and is lined with cotton. Cobwebs are freely used for sticking the loose pieces of fibre together. The nesting season of this Sunbird is not quite so extensive as that of the other, but it is in steady progress from early February to the end of August."

To this may be added that the nests are sometimes oval rather than pear-shaped and are composed of fine grasses, coir, fibre from palm-tree trunks, bits of leaf, bark etc., but mainly of rather fine grass, the high portico over the entrance being almost all grass. This portico projects some inch or more from the nest, but does not come low down in front of the entrance, which is large and badly finished off. A long tail below the nest, like that so common in the nests of the Purple Sunbirds, is hardly ever found in those of this bird.

The nests measure roughly from 4 by $2\frac{1}{2}$ inches to 5 or even 6 by 3 inches.

It is curious that in Sumatra many nests are built without a portico, and that in Borneo *no* nests have it.

In Siam, around Bangkok and Bonsukai, Herbert and Williamson have taken eggs from the 7th February to the 9th October. In Taiping Kellow took a nest in January, while Sody took nests in Sumatra in June and in Borneo in February and March.

The number of eggs laid is invariably two. The ground varies from pure white to a purplish-grey or pinkish-grey, sometimes quite strongly tinted. The markings consist of pale smears and blotches of grey, more or less tinged with purple and with a few black, or purplish-black, spots, hair-lines and hieroglyphics. In most eggs the impression given is that of a purplish egg but, in some, the ground and markings have no purple tinge, the latter being black or nearly so, with very faint secondary markings of grey. The eggs remind one much of those of *Hippolais rama* but are, of course, much bigger.

Sixty eggs average 17.3×12.6 mm.: maxima 19.5×12.3 and 18.4×13.3 mm.; minima 16.5×12.1 and 16.7×12.0 mm.

Anthreptes simplex.**THE PLAIN-COLOURED SUNBIRD.**(1291) **Anthreptes simplex frontalis** Blyth.**THE MALAY PLAIN-COLOURED SUNBIRD.**

Anthreptes simplex xanthochlora, Fauna B. I., Birds, 2nd ed. vol. iii, p. 412.
Anthreptes simplex frontalis, ibid. vol. viii, p. 067.

This Plain-coloured Sunbird, of which the type-locality is Singapore, is found all over the Malay Peninsula as far North as Tenasserim and peninsular Siam.

It is a bird of forest and jungle, both in the plains and lower hills up to some 2,000 feet and, though it enters gardens to feed, probably never breeds in them.

Hopwood is the only collector who has taken its nest. This he describes as "resembling a Munia's nest, but larger and pendulous, the entrance hole near the top but without a portico, made principally of grass and fibre, the ends sticking out in all directions. The lining of silk-cotton, thickly felted, and reaching up the sides of the nest to the top." The nest was attached to the end of a small branch of a Mangrove-tree and was taken on the 17th March at Maungmagan on the sea-coast of Tavoy.

It contained two eggs like the palest type of egg laid by the preceding species. The ground is white faintly tinged with lilac, and it is marked with a few lines and hieroglyphics of purplish-black and secondary smears of lilac-grey. The two eggs measure 20.1×13.0 and 18.6×12.9 mm.; it is possible they are abnormally or, at least, unusually large.

Subfamily ARACHNOTHERINÆ**(SPIDER-HUNTERS).****Arachnothera magna.****THE STREAKED SPIDER-HUNTER.**(1293) **Arachnothera magna magna** (Hodgs.).**THE INDIAN STREAKED SPIDER-HUNTER.**

Arachnothera magna magna, Fauna B. I., Birds, 2nd ed. vol. iii, p. 414.

This grand Sunbird occurs from the Sutlej Valley in the Western Himalayas as far East as the Chin Hills, and thence South through Western Burma to Tenasserim in the Thoungyin Valley and Tavoy.

This Spider-hunter, which is rare in the Western Himalayas, is very common East of Sikkim, especially in the Assam Hills, where it is resident and breeds from the foot-hills up to 6,000 feet, but mostly between 2,500 and 4,500 feet.

It is essentially a bird of forest and jungle and, though it occasionally enters gardens in Burma, it never breeds in them. Its favourite resorts are undoubtedly deserted jhums (cultivation clearings) in which the secondary growth has become fairly thick and in which there are numerous Banana- or Plantain-trees, or other suitable plants for building their nests upon, or rather under. I have also often found them breeding in groups of Plantain-trees which grow by stream-sides in virgin forest while, in Margherita, both Coltart and I obtained many nests in the densest of evergreen-forest where Banana-trees grew on the sides of ravines and water-courses either singly or in small clusters of half a dozen or so. At other times they resort to thinner scrub and breed among the giant Ginger-plants or make use of the great dock-leaves growing in the mossy undergrowth of dense forest.

In Sikkim Gammie found it breeding in the Chinchona-reserves, where also it selected Plantain-trees. Here the bird was said to breed from the foot-hills up to 5,000 feet but chiefly at about 3,000 feet.

The nests of the Spider-hunters are very beautiful and very wonderful structures, combining all the art of the Tailor-bird with that of the Weaver-birds. In the first place the birds select some broad green leaf under which they will build the nest. This leaf must be green, growing and in comparatively perfect condition. No leaf which is beginning to wither, no leaf with a broken stem and no leaf with punctures or holes will suffice for their need. The wild Plantain- (or Banana-) trees, which certainly supply homes for three out of every four nests, are most carefully chosen. The leaves of these trees very rapidly fray at the edges, the slits gradually extending towards the mid-ribs until, under the effects of wind and weather, they reach the mid-rib and hang like tattered ribbons on either side. The new leaves, green and strong, withstand the elements for some weeks, and one such is always selected. The leaf duly chosen, the surface is punctured with tiny little round holes; these are not mere slits, which would rapidly increase in size, but a tiny circular bit is cut out of the leaf, hardly exceeding a large pin's head in size. Through these are forced threads of vegetable cotton and cobwebs which are firmly knotted on the upper side of the leaf and hang loose below. Then gradually these loose ends are fastened to the skeleton leaves, which form nine-tenths of the nest material, more and more leaves being added and fastened very firmly together with cobwebs, silk and perhaps a few stems of grass and strips of dead Bamboo-leaves. Finally a beautiful hemisphere or half-oval is fashioned which hangs pendent from the leaf which forms its roof. To this it is generally drawn

up tight on the lower side but left free for rather more than an inch on the higher side to form an entrance to the nest. Sometimes, however, it is drawn up tight all round, a neat half-circular hole being formed instead for this purpose. The nest is most neatly and compactly made, not a leaf or scrap of grass or cobweb being out of place, while the lining, equally neat and compact, is formed of fine grass-stems or of skeleton leaves, flattened down.

In size the nests differ considerably; some measure about $4\frac{1}{2}$ by $4\frac{1}{2}$ inches, others 6 by 4 inches, and a few only considerably larger even than this. In depth they are about 4 inches and vary very little.

In the plains and lower hills the breeding season is principally April to June, a few birds breeding in March, but in the higher hills few birds breed until May, while others are still to be found breeding in July.

They are not normally double-brooded though, if one nest be robbed, they at once build another and lay again, never using the old nest for the purpose. Both birds assist in the construction of the nest and, considering how well it is made, it is built very quickly. A nest in Guujong was begun and completed in six days, and another which I found when just a few silk threads had been put in place was finished and contained two eggs when I returned ten days later. Both birds incubate, and we secured the male as often as the female on the nest.

Incubation takes twelve or thirteen days, but I have not been able definitely to say which.

The eggs normally number two, but clutches of three are not rare.

Hume says that "they are distinctly of the *Arachnechthra* type," but it is only a few eggs which could be so described. Most eggs appear to be a uniform rather rich brown or olive-brown, the depth of colour varying considerably. In nearly all there is a darker zone of the same colour at the larger end which may sometimes be seen to consist of innumerable specks of colour darker than those which coalesce over the whole of the surface of the eggs elsewhere. Occasionally these unicoloured eggs are quite a pale olive-grey, but when so pale are nearly always seen to be visibly freckled with darker when closely examined. Next most commonly met with are eggs with an olive-grey or olive-brown ground profusely speckled or flecked all over with darker grey or darker brown. This is the type Hume likens to that of *Arachnechthra* (= *Leptocoma*). Among unusual types in my own series the following are the most remarkable:—(1) Pale sea-green, boldly marked with blackish in a broad ring round the bigger end and with small blotches of the same scattered elsewhere. (2) Pale creamy-pink, flecked all over with dingy pink and underlying specks of grey. (3) Reddish-stone, profusely marked all over with small blotches of deep, rather purplish, brick-red. (4) Olive-grey, speckled lightly all over with blackish but with the small ends unspotted and almost white.

In shape the eggs are moderate or rather long ovals, often slightly pointed or peg-top in shape. The texture is very fine and close and nearly all eggs have a fine gloss. The shell is hard and strong in proportion to the size of the egg.

One hundred eggs average 22.7×15.95 mm.: maxima 24.2×16.2 and 24.0×16.4 mm.; minima 19.5×16.2 and 22.5×15.0 mm.

(1294) *Arachnothera magna aurata* Blyth.

THE PEGU STREAKED SPIDER-HUNTER.

Arachnothera magna aurata, Fauna B. I., Birds, 2nd ed. vol. iii, p. 416.

This race of the Streaked Spider-hunter replaces the preceding bird in East Central Burma, ranging from about the latitude of Myingyan in the North to that of Moulmain in the South. Mackenzie found it by no means uncommon in Prome and Pegu, where he took a number of nests with eggs, the latter now all in my own collection.

As Mackenzie is the only collector who has succeeded in taking the nest I quote his description *in extenso* (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, pp. 669-71, 1919). He writes:—"The birds are by no means rare in this immediate vicinity" (Pegu Yomas). "On July 24th I noticed one fly past with a thread of silk or cotton in its bill, but a long search failed to bring its nest to light.

"On July 28th I was out for a long day's logging. As I was walking along a rather slippery felled teak I put out a hand on to a creeper growing beside it to steady myself. From right under my hand an *Arachnothera aurata* flew out and, after a very short search, I found its nest containing two eggs.

"The nest was on the underside of a leaf of a thorny climber (*Smilax macrophylla*). It was hung from the leaf by about 100 little threads of silk, each worked into the material of the nest, pushed through the leaf and knotted on the upper side. These threads ran all round the back and sides of the nest, but were specially numerous at the two ends of the rough semicircle thus formed.

"On the upper surface, the semicircle of knots was about $\frac{3}{4}$ " wide and 5" in external diameter. The front was open, and the nest was so built that, when the leaf was hanging naturally, there was a space of about $1\frac{1}{4}$ " between the edge of the nest and the leaf in front, the back being close up against the leaf. Water was kept out of the holes in the leaf by the knots; when I found it it had been raining heavily, but the inside of the nest was quite dry. The combined strength of the supporting threads was considerable.

"The nest was a cup, high at the two sides and low at the back and front, made of vegetable fibre, ornamented scantily on the outside with skeleton leaves and bits of bamboo-leaf. Round the

lip of the nest were several pieces of white, curly bark, from bamboo spathes, I think.

"The nest was about $2\frac{3}{4}$ " across the top, rather less from back to front or more from side to side. Externally it was $2\frac{3}{4}$ " deep at the front and back, and $3\frac{1}{4}$ " at the sides, internally $1\frac{3}{8}$ " deep at front and back, and correspondingly deeper at the sides. The internal hollow was $1\frac{3}{4}$ " across from front to back and 2" from side to side.

"The nest was compactly put together and lined with vegetable down, scantily mixed with fine fibres, the whole forming a pad at the bottom of the nest which was easily removed. The rest of the nest was entirely made of strips of brown vegetable (bark) fibre, but finer on the inside, which were not felted together but which appeared to be put in one by one and worked into shape.

"The nest was about 5' from the ground, on the top of a ridge with some secondary growth round it in a patch of open jungle of mixed bamboos and small trees."

Later Mackenzie found several other nests quite similar to the one described, but one was placed under a Teak-tree leaf, one other under a leaf of the same *Smilax* as that under which the first was suspended, and others under other big-leaved plants. Although the birds of this and the preceding race are much the same in size, the present one seems always to build a smaller nest than its Himalayan cousin and to use far fewer skeleton leaves in its construction.

Mackenzie found one nest with a single egg on the 27th April and all the others in July and August. They contained two eggs or one only, the latter being probably incomplete clutches.

They are quite indistinguishable from those of *A. m. magna*, but are all of the uniform brown or olive types, some with faint indications of darker zones about the larger end.

Eight eggs average 21.5×15.4 mm.; maxima 23.2×15.0 and 22.1×15.5 mm.; minima 20.0×14.5 mm.

Arachnothera affinis.

THE GREY-BREASTED SPIDER-HUNTER.

(1295) *Arachnothera affinis modesta* (Eyton).

THE MALAY GREY-BREASTED SPIDER-HUNTER.

Arachnothera affinis modesta, Fauna B. I., Birds, 2nd ed. vol. iii, p. 418.

This Grey-breasted Spider-hunter occurs from Muleyit in Tenasserim, through the Malay Peninsula, to Sumatra and Borneo.

The only note I can find on its breeding is one by Mr. H. N. Ridley (Journ. Straits Branch R. As. Soc. vol. xxxi, p. 86, 1898):—"*A. modesta* haunts the large-leaved gingers and Heliconias in the gardens, and I found a nest made of skeletons of leaves and fibre and

bast, apparently from a lining of a squirrel's nest, and bark, between two leaves of their plants, which had been pegged together by bits of sticks, by some person. One little bird was sitting on the nest nearly fully fledged. I have seen one of these spider-hunters pursuing a very large cricket in the gardens."

Arachnothera longirostra.

THE SMALL SPIDER-HUNTER.

(1296) **Arachnothera longirostra longirostra** (Lath.).

THE INDIAN SMALL SPIDER-HUNTER.

Arachnothera longirostra longirostra, Fauna B. I., Birds, 2nd ed. vol. iii, p. 418.

This little Spider-hunter is not rare in South-Western India from Belgaum to Southern Travancore, where it was found breeding by Bourdillon and Stewart. It is then again obtained in great numbers in East and South Assam, whence it extends throughout the whole of Burma, South to the Malay States. To the East it is common in Siam, Annam and Cochin China.

It is essentially a bird of green forest, frequenting alike the deeper, darker recesses and the sunlit glades and exteriors, while it also haunts secondary growth and, in Travancore only, land covered with elephant-grass. It is undoubtedly more common below 2,000 feet than above this height, but I have found it breeding occasionally up to 5,000 feet in Assam, while it is recorded as occurring in the Himalayas up to 6,000 feet. In Travancore Stewart says that it is a bird of the green, humid forests below about 2,000 feet, but that it does range up to 4,000 feet. In Kanara, however, Davidson says that so far from being a forest bird he has "only seen it on a few occasions, and then all in gardens above the Ghâts." He gives, after this remark, the first description of its nesting recorded (Journ. Bomb. Nat. Hist. Soc. vol. vi, p. 337, 1891):—"The bird chooses a large plantain-leaf a few feet from the ground, and to its underside sews its nest. This is composed of skeleton leaves an inch or two thick, and is nearly a foot sometimes in length. It has an entrance at each end and in the middle there is a hollow thickly padded with fine grass. I have always found two eggs or young; the nests have always been found by me in February and March."

In Assam the nests made differ from the above in being smaller, neater and very seldom having two entrances. They may be placed under almost any big leaf. The favourite sites are the under surface of Castor-oil or Plantain-leaves, but I have seen them built under leaves of "Tannaahs," "Khydias," Ginger, Dock and those of the Giant Elephant-creeper, while in Travancore Stewart found nests built under the broad blades of elephant-grass. A description of a nest taken by me in Cachar and sent to 'The Asian'

newspaper is typical of nine out of ten:—"This nest was of the same shape as the last, cup-shaped, and was attached to the under-side of a leaf of a stunted Plantain-tree. In measurements externally it was 4.1 inches across and slightly less in depth; the walls were very thick and compact, being .4" at the edge, .6 just below and almost an inch at the bottom. The materials consisted principally of skeleton leaves and very fine soft grass with a few shreds of the outer bark of ekra stalks, the lining being a mass of vegetable down, most beautifully matted and felted down to the bottom and walls of the nest."

Sometimes the nests are more oval in shape, say about 6 inches long by 4 inches wide. All are fastened to the leaf, in the same way as that of the Great Streaked Spider-hunter, by a vast number of threads of silk and spiders'-web fastened through the supporting leaf, with a knot on the upper side. In some nests the threads form a three-quarter circle round the upper edge of the nest, the remaining quarter being without threads and hanging well below the leaf so as to form an entrance. In some nests, however, the whole rim is drawn taut to the leaf and a regular circular hole is made for the ingress and egress of the parent birds. I have seen no nests in Assam or Burma anything like as big as the 9-inch nest recorded by Davidson.

In Assam this little Spider-hunter breeds principally from May to August, but I have taken eggs from the 24th March to the end of September, and many birds have two broods, never, I believe, in the same nest. In Kanara (*vide* Davidson) they breed in February and March, but I have seen eggs taken by him in August, while Stewart and Bourdillon took eggs in Travancore from the 7th March to the end of May.

The eggs are nearly always two only in number, occasionally three, and bear no resemblance to those of the larger Spider-hunters. The ground varies from white, faintly tinged with pink to a fairly warm salmon-pink, which is, however, exceptional. They are marked with tiny specks, like pin-points, of reddish, very thinly everywhere except in a sharply defined ring round the larger end. The depth of colour of the markings varies a little from pale to dark reddish or brick-red, but the eggs are remarkably constant and the only real variation I have seen is in two pairs of eggs from Siam, which are pure dead white with a narrow ring of black spots with grey specks underneath them.

The texture of the eggs is fine but not close and the shells are very fragile. In shape they are normally long obtuse ovals; short broad ones are exceptional.

One hundred eggs average 18.46×13.1 mm.: maxima 19.1×13.1 and 18.1×13.9 mm.; minima 17.0×13.3 and 18.8×12.5 mm.

Both sexes incubate and the cock bird certainly helps in the construction of the nest in so far as fetching materials goes, but I have not seen him putting these into position.

Family DICAËIDÆ

(FLOWER-PECKERS).

Dicæum cruentatum.

THE SCARLET-BACKED FLOWER-PECKER.

(1297) *Dicæum cruentatum cruentatum* (Linn.).

THE INDIAN SCARLET-BACKED FLOWER-PECKER.

Dicæum cruentatum cruentatum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 421.

This little Flower-pecker occurs from Eastern Nepal to Eastern Assam, Eastern Bengal to Dacca, Chittagong and Tippera; Manipur, Looshai and Northern Chin Hills. Its distribution East and South is not yet definitely known but it probably meets the next race, *ignitum*, in Central Arakan and the Lower Chindwin.

It frequents forest, where this is open and not too dense, cultivation, orchards and open country, provided this is well wooded, at all elevations from the plains up to some 4,500 feet. The position selected for the nest varies greatly. I have taken them attached to the bunches of parasitic plants growing 50 feet or more up in great forest-trees, so high up that even with glasses it is impossible to detect the nest in among the bunches of leaves. Only actual inspection after climbing up to the spots, shown by the birds when carrying materials, can divulge the site of the nest. Once I have taken the nest from a bush not 5 feet high; usually, however, it will be taken from between 20 and 30 feet, built at the end of some small outer branch from which it hangs well hidden by surrounding leaves. The only nest recorded in Hume's 'Nests and Eggs' is one taken by Cripps in Dibrugarh which was fastened to a twig of a Guava-tree about 5 feet from the ground. Curiously enough I have taken two from the same kind of tree growing just outside Cachari villages, but these were between 10 and 20 feet up in the trees.

The nests of all Flower-peckers are much alike and the description of the nest of this bird suffices for all. They seem to be invariably made of the beautifully soft seed-down of the Simul-tree (*Bombax malabarica*), very little compressed or felted but kept in shape and position by a few shreds of grass, fungoid mycelæ or by very fine hair-like roots. The nest is egg-shaped and the materials, other than the down, are used to work round the twig from which the nest is pendent, and from this they are brought down and round the nest itself, a few of the longer strands coming under the nest and up again on the far side. Round the rim of the entrance,

which is rather large and at the upper side of the nest, a few grasses are twisted, making it firm enough to withstand the constant passing in and out of the parent bird. Here too, as on the outside of the nest, cobwebs and silk are sometimes used to strengthen its structure. The lining is of the same cotton-seed down and quite soft when first put in, but soon becoming more or less felted when the eggs are laid and the birds begin to sit.

The little oval nest measures roughly about $3\frac{1}{2}$ inches long by $2\frac{1}{2}$ broad, the opening into it being at least an inch in diameter and, occasionally, having a white downy porch above it projecting about $\frac{1}{2}$ inch from the nest. Some nests are smaller, not more than 3 by 2 inches, and a few are a trifle larger. I have seen one in which rather an excessive amount of cotton-down had been used measuring about $4\frac{1}{2}$ by $3\frac{1}{2}$ inches.

The breeding season is principally May and June, but I have taken eggs from the 4th April to the 28th August. In Dibrugarh, where Cripps took his nest in May, Coltart and I also took many nests from April to the end of June.

The eggs number two or three in a full clutch, and once Coltart found four in a nest.

When first laid they are a very pale grey, looking practically white unless contrasted with a really white egg. The grey, however, soon fades, and it is then very difficult to distinguish the eggs of the Flower-peckers from those of the various Munias.

The shell, for so tiny an egg, is stout, but there is no gloss, though the surface is fine and close.

Forty eggs average 14.0×10.3 mm. : maxima 15.3×11.1 mm. ; minima 13.1×10.2 and 18.3×10.0 mm.

I have seen both little birds, cock and hen, taking materials to the nest and, though I have never been able to see whether both place them in position, I think they do.

Both incubate, and we have trapped both sexes on the nest.

Incubation probably takes only ten days, certainly not more than eleven.

(1298) *Dicæum cruentatum ignitum* Beghie.

THE BURMESE SCARLET-BACKED FLOWER-PECKER.

Dicæum cruentatum ignitum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 423.

The range of this subspecies extends over the whole of Burma South and East of the preceding race. Thence it is found throughout the Malay States to Java and Sumatra. Vaughan and Jones apparently found it breeding at Houlich, South China, but the eggs obtained were not those of a Flower-pecker, though they might have been those of some Cuckoo parasitic upon it.

Hopwood also, once, obtained a nest in Tavoy with a single egg on the 24th February.

Oates found this species common in Pegu, and gave a full account

of its nesting, which is exactly like that of the typical form. I, however, quote the following interesting details :—" I have taken many nests of this bird from the 2nd March to the 9th April. The number of eggs laid is two or three.

" The nest is generally built in Mango-trees, hut other trees, especially if the leaves are large and drooping, are also used. It is placed at all heights from the ground, from twelve feet to the summits of the highest trees. The nest is suspended from an outside twig, and is so surrounded by leaves that it is almost invisible.

" To say that the nest is most beautiful is only to say what is applicable to the nests of all Flower-peckers. It measures no more than 4 inches in height and one nest I have is only $3\frac{1}{2}$ inches. It is egg-shaped, slightly pointed at the upper end, where it is attached to the branch. Its external diameter is 2 inches. The entrance is circular, $\frac{3}{4}$ inch in diameter, and placed just midway between top and bottom of the nest. The egg-chamber is small, the walls being of considerable thickness.

" The bulk of the nest is made of the finest vegetable down of dazzling whiteness resembling spun glass, and interiorly the nest is kept firm by being bound round by fine grass, which is twisted into a rope at the lower edge of the entrance. At the back of the nest there are a few patches of excretæ of caterpillars and, in another, four dry blossoms of some shrub are stuck at the back of the nest. As a rule, however, no ornamentation is attempted."

The eggs are the usual short, blunt ovals, grey-white and glossless.

Eight eggs average 14.2×10.0 mm. : maxima 14.4×10.6 and 14.0×10.7 mm. ; minima 13.1×10.6 and 14.0×9.35 mm.

(1299) *Dicaëum cruentatum siamensis* Kloss.

THE SIAM SCARLET-BACKED FLOWER-PECKER.

Dicaëum cruentatum siamensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 424.

Within our limits this bird only occurs in Eastern Tenasserim, but is extremely common in Siam and Annam.

It has not been found breeding in Burma, hut Herhert has a very interesting account of its breeding in the Bansakai Gardens, Bangkok, together with a beautiful photo of the nest (Journ. Nat. Hist. Soc. Siam, vol. vi, p. 295, 1924). He writes :—"The breeding season is January and February. During February 1920 I saw no less than 10 nests in the Bansakai Gardens."

The nests he describes as just replicas of that described by Oates for the preceding bird, but most, he says, are "usually from 15 to 20 feet from the ground, although one recorded from Pakret was on a lime-bush at 4 feet only."

The eggs are quite typical of the genus.

Ten eggs average 14.1×10.6 mm. : maxima 15.0×11.1 mm. ; minima 13.6×10.0 mm.

Dicæum trigonostigma Scop.

THE ORANGE-BELLIED FLOWER-PECKER.

(1300) *Dicæum trigonostigma rubropygium* Stuart Baker.

THE TENASSERIM ORANGE-BELLIED FLOWER-PECKER.

Dicæum trigonostigma rubropygium, Fanna B. I., Birds, 2nd ed. vol. iii, p. 425.

This Flower-pecker has a very curious distribution. It occurs, and is not very rare, in the sub-montane tracts in the Lakhimpur district of Eastern Assam. It has not, however, been recorded from anywhere else North of Pegu, whence it extends as far as latitude 10° in the Malay Peninsula; it is also found in Western Siam.

This is apparently a forest-bird, frequenting glades, edges of streams and the borders of forest near cultivation. In Lakhimpur we never found it below about 1,000 feet in the evergreen-forest, where it haunted rocky, broken hill-sides but, so far as we knew, it never occurred at any of the higher elevations. We quite possibly missed it in the plains.

The first nest we saw was brought in by Nagas, together with both the parents, while others we subsequently found were just like it but smaller. They differed in no way from those of the birds of this genus already described except in size, as they measured between 5 and 6 inches in height by 3 to $4\frac{1}{2}$ in breadth.

Later Kellow found nests of this species near Perak in the Malay States which were exactly like those found by us in Assam. All were built on high trees, generally between 35 and 40 feet from the ground, with one exception, which was on a wild Citron-bush, close to a jungle-track.

The eggs are quite typical, and ten average 15.5×11.25 mm. : maxima 17.6×11.9 mm. ; minima 14.3×10.8 mm.

The breeding season in Assam is April and May, but in the Malay Peninsula commences in February and continues until early May.

Dicæum chrysorrheum Temm.

THE YELLOW-VENTED FLOWER-PECKER.

(1301) *Dicæum chrysorrheum intensum* Stuart Baker.

THE SIKKIM YELLOW-VENTED FLOWER-PECKER.

Dicæum chrysorrheum intensum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 426.

This race of Yellow-vented Flower-pecker ranges from Sikkim and Eastern Nepal to Assam, Manipur, Lushai Hills, Chittagong and Hill Tippera in Eastern Bengal.

It seems to be entirely a hill-breeding bird. In Assam we found it nesting from about 1,000 feet upwards in Lakhimpur and from

about 2,000 feet in the hotter ranges of Cachar and Sylhet, while in the Naga Hills it certainly occurs as high as 8,000 feet and again nearly as high in Sikkim. It breeds both in forest and in open country, but is much attracted by the vicinity of flowering Orchids, doubtless on account of the insects haunting these, and I have seen its nest actually attached to a flowering stem of a *Dendrobium*. There is little one can say of its nesting habits which is not equally applicable to any of the other Flower-peckers. As a rule its nest is not placed so high up in trees, more nests being built under than over 20 feet, while the birds often employ scraps of moss to decorate their nests outside. They also employ more grass or fibre in the support of the *Bombax* cotton-down which forms the bulk of the nest. This measures roughly about $4\frac{1}{2}$ inches from top to bottom by $3\frac{1}{2}$ or 3 inches in breadth.

The breeding season is April, May and June, a few birds laying in July. The birds are not, I think, double brooded. Both sexes incubate and both assist in building the nest.

The eggs number two or three in a clutch and are like all other Flower-peckers' in appearance.

Sixteen eggs average 15.3×11.0 mm.: maxima 16.0×11.1 and 15.0×11.4 mm.; minima 14.5×10.5 mm.

Dicaëum ignipectum.

THE FIRE-BREADED FLOWER-PECKER.

(1303) *Dicaëum ignipectum ignipectum* (Hodgs.).

THE NEPAL FIRE-BREADED FLOWER-PECKER.

Dicaëum ignipectum ignipectum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 427.

This species of Flower-pecker has an immense range, extending from the Sutlej River in the Western Himalayas to the whole of Assam, the mountains of Burma as far South as Tenasserim, and then East into Siam, Annam and Yunnan, while there are also specimens in the British Museum from Foochow and Fohkien.

It is possible that with better material for examination the typical race will have to be divided into three: the pale North-Western birds and, again, richly coloured Eastern ones being separated from the central Himalayan ones.

It is a bird of high elevations, probably breeding up to 12,000 or 13,000 feet, at which latter elevation Forrest obtained it in Yunnan. It certainly also breeds up to 12,000 feet both in Garhwal and Sikkim.

Thompson describes a nest taken by him in Naini Tal as like that of a *Piprisoma*, while Hodgson describes nests made of green moss and hair-like fibres in Nepal. Both of these descriptions seem referable to the nests of some other bird.

Whymper found it breeding during March in Naini Tal at 5,000 feet, while I have taken many nests in the Cachar Hills about 5,000 and on the Peak in the Khasia Hills at about 6,000 feet. The nests found by both Whymper and myself are quite indistinguishable from those of other birds of the genus *Dicaeum*. They were all built in small trees standing in ravines in dense forest at 12 to 20 feet from the ground, except one which was about 30 feet up on a wild Mango-tree. Occasionally the birds decorate the nest rather freely with scraps of green moss, and there is nearly always a little of this at the top.

Cook also found it breeding in Kalaw, Shan States, and gives a similar description of a nest and eggs which he found on the 26th February. Mackenzie took nests with eggs in the Upper Chindwin in April.

The nesting season lasts from March to June and the usual clutch of two or three little white eggs is laid.

The average of eighteen eggs is 14.8×10.3 mm.; maxima 16.6×10.0 and 14.1×10.9 mm.; minima 13.3×10.2 and 16.6×10.0 mm.

Dicaeum concolor.

THE PLAIN-COLOURED FLOWER-PECKER.

(1304) *Dicaeum concolor concolor* Jerdon.

THE NILGIRI PLAIN-COLOURED FLOWER-PECKER.

Dicaeum minullum concolor, Fauna B. I., Birds, 2nd ed. vol. iii, p. 429.

Dicaeum concolor concolor, *ibid.* vol. viii, p. 667.

This little Flower-pecker is found from North Kanara to South Travancore, through the Nilgiri, Palni and other ranges of hills, resident and breeding from the foot-hills to the highest peaks. It is a bird of open country, gardens and the vicinity of villages, but they also breed in forest, for Howard Campbell says: "Nests are not uncommon in the sholas about Ooty. They build both *in* and on the outskirts of these and also in and about the station itself."

Rhodes Morgan describes the nest as being exactly like those already described of other Flower-peckers. Bourdillon (Travancore), Cardew and Campbell (Ooty) and Davisou (Kanara) also agree with this. In Hume's 'Nests and Eggs,' however, there are two descriptions given which do *not* agree and, as the identification in both instances seems satisfactory, it is necessary to quote them. Hume himself says "The nests of the Nilghiri Flower-pecker are regular purses, comparatively large for the size of the bird, reminding one much of those of *Piprisoma agile*. They are hung like those of the *Arachnechthra*'s from a slender twig, but whereas the apertures in the Honey-suckers' are in the sides or parallel with the supporting twigs, the entrance in the Flower-peckers' is in front, or at right-angles

to the twig. They are lined with the finest and silkiest vegetable down, and externally the nest is composed of vegetable fibres, lichen, little pieces of grass, portions of leaves, and some little cobwebs; lining and all included, they are scarcely anywhere more than $\frac{1}{2}$ inch in thickness. They vary a great deal in size externally; some are at least 4 inches deep, measured from the bottom of the nest to the top of the suspending twig; others are not above 3 inches. Internally the cavity is from $1\frac{1}{2}$ to $1\frac{3}{4}$ inches in depth and in diameter 1 to 2 inches."

Davison says that nests taken by him are "pear-shaped, composed externally of cotton, bits of moss, a few odd feathers, and the pappus of asteraceous plants, closely and compactly put together; on the inside it is thickly felted with this pappus and other soft substance mixed with feathers."

The usual breeding months are February to April, but many birds also lay in January and again in May and June, perhaps second broods, though Bourdillon gives March to May as the normal breeding months in Travancore.

The number of eggs laid is nearly always two only, very seldom three. Davison and Hume say that this species normally lays three, but everyone else says two only.

They are quite typical of the genus in appearance, and twenty average 14.7×10.6 mm.: maxima 16.2×10.6 and 14.5×11.1 mm.; minima 14.0×10.1 .

(1305) *Dicaëum concolor subflavum* Stuart Baker.

THE BELGAUM PLAIN-COLOURED FLOWER-PECKER.

Dicaëum minullum subflavum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 430.
Dicaëum concolor subflavum, ibid. vol. viii, p. 667.

This subspecies is found North of the area occupied by the preceding bird from Belgaum to Khandala and Mahabaleshwar and thence East into the Central Provinces.

A nest sent me from Belgaum was exactly like all those I have seen of the Nilgiri bird and contained two eggs measuring 14.6×10.6 and 14.8×10.7 mm. The nest was said to have been suspended from an outer twig of an Acacia at about 20 feet from the ground, one of several trees growing on a roadside. It was taken on the 17th February.

(1306) *Dicaëum concolor olivaceum* Walden.

THE BURMESE PLAIN-COLOURED FLOWER-PECKER.

Dicaëum minullum olivaceum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 430.
Dicaëum concolor olivaceum, ibid. vol. viii, p. 667.

Of all the Plain-coloured Flower-peckers this race has the widest range. In the Himalayas it extends from Nepal and Sikkim to

the Kachin Hills and Shan States and from the latter, in the hill-ranges South to the whole of the Malay States. East it occurs in Yunnan, Siam, Annam and South China.

This Flower-pecker is exceedingly common in Assam and in the Chin Hills from the level of the plains up to about 6,000 feet, possibly also breeding in the plains themselves but most commonly between 1,500 to 3,000 feet. It frequents the outskirts of forest or wide glades and the banks of streams in forest, open cultivated land, scrub-jungle and secondary growth, but where there are orange-groves and fruit-gardens seems to prefer these to any other places to nest in. The height at which the nest is built varies very greatly. I have found them on quite small plants growing among weeds, nettles and briars, on high bushes and, most often, high up in big trees, sometimes over 40 feet from the ground and generally over 20.

The nest is exactly the same as that made by other Flower-peckers of the genus *Dicaeum*. Perhaps, of all of them, this bird makes the whitest nest, composed more exclusively of the down of *Bombax malabarica*, with less other material to bind it together. It is very tiny, sometimes measuring no more than 3 inches high by 2 inches broad.

I have never seen nests like the moss-and-grass affair described by Miss Cockburn, nor have I seen any which in the least reminded me of *Piprisoma* nests, as has been noted by other observers.

The breeding season in Assam is mainly in May and June, but I have taken eggs from the 12th March up to the 30th August, and many birds must have two broods.

Both sexes help in the construction of the nest and we have often trapped the cock bird when sitting on the eggs, proving that both sexes incubate.

The eggs, which are quite typical, number two or three, more often the former than the latter.

Forty eggs average 14.5×10.6 mm.: maxima 15.9×10.4 and 15.7×11.1 mm.; minima 13.0×9.9 mm.

Dicaeum erythrorhynchus *.

THE YELLOW-BILLED FLOWER-PECKER.

(1308) *Dicaeum erythrorhynchus erythrorhynchus* (Lath.).

THE INDIAN YELLOW-BILLED FLOWER-PECKER.

Dicaeum erythrorhynchum erythrorhynchum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 432.

The distribution given in the 'Fauna' is complete and has not been added to since it was published. Northern India from Dehra

* Wait points out ('Birds of Ceylon,' p. 150) that *erythrorhynchus* is a compound Greek name and should not alter its termination, whereas *ceylonensis* should be *ceylonense* to agree with *Dicaeum*.

Dun and Dharmasala to Dacca and Calcutta; Northern Assam to Dibrugarh; all Bengal and Bihar; the United Provinces and the Punjab, South through the Bombay Presidency to the Palni Hills and Mysore; Central Provinces. In the East it has been recorded from Arakan and Tenasserim and has also been obtained in the Shan Hills.

Although Davidson found this bird breeding in some numbers on trees growing in ravines in dense, or rather dense, evergreen-forest in Kanara, it is far more a bird of open and cultivated country than of thick cover. Undoubtedly its favourite site is a Mangrove, in which it builds its nest in the thick foliage of the trees at heights between 10 and 20 feet, and very seldom at the great heights affected by some other Flower-peckers. It is really a bird of the plains, though it is also found in the low hills and broken country adjacent to them. In the Outer Himalayas it ascends only to some 4,000 feet and only exceptionally so high as this.

The nest requires no description, as it is exactly like those of the genus already described. Beavan, Butler and others have all said that the nest of this bird reminds them of that of *Arachnechthra* (= *Leptocoma*), but to me they bear little resemblance. The tiny white egg-shaped nest of *Dicaëum*, made of the finest cotton-down, which everywhere shows through the binding material of grass-stems, fibre etc., is very unlike the very untidy, almost shapeless ball or long purse-nest built by the Sunbirds, which is always more or less adorned with many oddments hanging about in all directions.

Mr. O. C. Ollenbach sends me a most interesting note on this bird's breeding. After describing nests and sites, both agreeing well with what other writers have written, he goes on:—"Do you know if it is the habit of these Flower-peckers to build their nests near ants' nests. The *Dicaëum* nests I have recently taken, have been built almost alongside nests of the vicious red tree-ant. Curiously enough the ants do not molest the birds or their brood though they swarm over the nest itself." This combination of nests, quite possibly because the birds seek the protection of the ants, has never before, I believe, been noticed of this genus.

The breeding season is from February to June, and many pairs have two broods, building a new home for each brood, often within a few paces or less of the last one.

Beavan took eggs at Barachabee in March and April; Aitken took one at Poona on the 10th April, in which month Butler also took eggs in Belgaum. Cock says that in Oudh they generally breed in May, but Jesse took many nests with eggs at Lucknow in February and March. Davidson obtained eggs from February to June, while in Bihar Inglis and Coltart took nests with eggs from March to July.

The eggs number two only, very seldom three, and are quite typical.

Thirty eggs average 14.4×10.5 mm.: maxima 15.1×11.1 mm.; minima 13.1×10.2 and 14.1×10.1 mm.

(1309) *Dicaeum erythrorhynchus ceylonense* Babault.

THE CEYLON YELLOW-BILLED FLOWER-PECKER.

Dicaeum erythrorhynchum ceylonense, Fauna B. I., Birds, 2nd ed. vol. iii, p. 433.

This Flower-pecker is confined to Ceylon.

There is nothing on record about the breeding habits of this race beyond Wait's note ('Birds of Ceylon,' p. 151):—"The breeding season seems to be from April to August, but in the hills some birds breed in the North-East Monsoon. The nest is generally a pear-shaped structure, like that of a Sunbird, but I once saw a nest, presumably of this species, like a little hammock suspended at either end from a twig. The two or three eggs are pure white, glossless ovals. Average size .6 by .4 inches."

Tunnard took two nests of this bird in the Ramboda district at 5,400 feet. One was attached to a branch of a wild Cinnamon-tree, 20 feet from the ground, the other to a jungle-tree at 25 feet.

The nests are described as being exactly like those of the Indian subspecies, but Tunnard says that one he found was exceptionally firmly attached to the supporting twig, the materials being woven over it for a length of $2\frac{1}{4}$ inches. The two nests taken by him measured $3\frac{3}{4}$ inches by $2\frac{1}{4}$ and 4 inches by $2\frac{1}{2}$, and were taken on the 20th May and the 10th March, each containing two partially set eggs.

Two given to me measure 15.4×11.0 and 15.1×10.4 mm.

Piprisoma agile.

THE THICK-BILLED FLOWER-PECKER.

(1311) *Piprisoma agile agile* Tickell.

THE INDIAN THICK-BILLED FLOWER-PECKER.

Piprisoma squalidum squalidum, Fauna B. I., Birds, 2nd ed. v. iii, p. 435.
Piprisoma agile agile, *ibid.* vol. viii, p. 668.

This Thick-billed Flower-pecker is found over practically the whole of India from the Himalayas to, and including, Ceylon. East it occurs as far as Calcutta, Dacca and Mymensingh, but is replaced in Assam by the next subspecies. It is not found in dry, desert areas such as Sind or parts of Rajputana etc., frequenting well-wooded, cultivated country. It may occasionally be found on the outskirts of forests, but its favourite resorts are orchards, gardens and clumps of trees in cultivation, though it also sometimes nests in thin scrub-jungle about villages. Whymper found it breeding at 5,000 feet about Naini Tal, Haughton took it at 7,000 feet near Darjiling, while it is common a little lower down in the Cinchona-reserves near that place.

Hume gives an exhaustive account of the nest ('Nests and Eggs,' 2nd ed. vol. ii, p. 277):—"The nests vary greatly in material, but very little in size or shape. They are invariably small, rather full-bottomed, purse-like bags, hung from a small twig as nearly horizontal as possible, and with the aperture with its major axis in the same plane as the twig to which the nest is suspended and immediately below the twig. Typically the nest is a felt-like friable fabric composed of fibres, and the down taken from young shoots and flower-buds of various plants, specially from the *Butea frondosa*, and our two common Indian *Loranthi*. The fabric is soft and pliable, so that one nest before me, taken more than six months ago, may even now be rolled up without injury. This, however, is not the only type of nest constructed by this species. It sometimes makes a nest of the same shape and dimensions, it is true, but of widely different materials. In these cases the exterior skin of the nest, if I may so term it, is a very loose network of very fine tow-like fibres, backed internally throughout by a thick felting of the soft silky pappus or seed-down of some asteraceous plant."

The nests vary in size from 3 inches long by less than 2 inches broad to about $3\frac{1}{2}$ by $2\frac{1}{2}$ inches; the very thin felt-like walls are not more than $\frac{1}{8}$ inch thick, gradually increasing towards the bottom, where they become nearly $\frac{1}{4}$ inch thick. The inner measurements correspond in size and are not reduced by any thick lining of any kind. The top of the nest is not pointed but is woven and wound round the supporting twig for a distance between $\frac{1}{2}$ and $1\frac{1}{2}$ inches.

Although looking fragile, the nests are very tough, and I have had some for many years which could now be rolled up, thrown about a room and then restored to perfect shape.

Hume makes no mention of cobwebs as forming part of the felt-like fabric, but Thompson and Beavan both say that spiders' webs are used to felt the material together. In colour most nests are a red-brown; Inglis has found nests a grey-brown in tint and I have seen one which was all dull brown. The nests are usually attached to twigs of trees at any height between 10 and 20 feet, sometimes as much as 30 feet, at other times less than 5 feet from the ground. Undoubtedly where Mango-groves exist these form the favourite sites, and the Mango-trees are the favourite trees on which to build.

In Bihar the nesting season is from the middle of February to the end of April, but in other parts of the plains many birds breed in May, while in the hills April to the middle of June are the months in which eggs are laid.

Three eggs form the normal clutch, but two only are sometimes taken and, very rarely, four eggs are laid, Barnes having taken a clutch of this number in Saugur, Central Provinces.

In colour the eggs differ from those of any other species of Indian bird and cannot be mistaken. The ground-colour is a pale pink, sometimes very pale, generally rather warm, while the markings consist of blotches or specks of brick-red, in shade rather light to

very deep, almost blackish-red. In most eggs the blotches are scattered fairly thickly over the whole surface and are still more numerous at the larger end; in some they are more sparse and, in a few, more especially the speckled eggs, they are so numerous that they nearly obliterate the ground-colour. In some eggs they are sparse everywhere except in a dense ring round the larger end. The underlying spots are of lavender- or lilac-grey and occasionally these dominate the colour and give the lilac or claret tint to the whole egg referred to by Hume. As a series the eggs give the impression of a pink ground, very richly blotched with rather dark brick-red.

The shape varies from a rather long blunt oval to a short broad oval, rather pointed at the small end. The texture is coarse for the size of the egg, fairly close but quite glossless.

Seventy-six eggs average 15.9×11.5 mm.; maxima 17.1×12.0 and 16.6×12.1 mm.; minima 14.1×11.4 and 14.8×11.0 mm.

Thompson says that both birds work at their nest, "alternating the time of arrival and departure with material."

(1312) *Piprisoma agile modestum* (Hume).

THE BURMESE THICK-BILLED FLOWER-PECKER.

Piprisoma squalidum modestum, Fauna B. I., Birds, 2nd ed. vol. iii, p. 436.
Piprisoma agile modestum, ibid. vol. viii, p. 068.

The present race of Thick-billed Flower-pecker is found over the whole of Burma South to Tenasserim. West it extends into Assam and is the form found in Cachar, Sylhet and Lakhimpur. East it occurs in the Shan States and Siam.

So far as I am aware no one has taken the nest of this bird except Coltart and myself. Those taken by myself were all situated in open glades or by rivers and streams flowing through forest, or else in thin scrub and deserted cultivation. A nest taken by Coltart was in tea-cultivation at the edge of forest.

Except that it is more of a jungle-breeding bird than the typical subspecies there is little one can add about its breeding, nest, or eggs which does not equally refer to that bird.

Most nests are attached to the small outer branches of trees and saplings at 10 feet or under from the ground, but I found one which was built on a wild Mango-tree about 40 feet up and only discovered by accident, the bird flying to it, with a long cobweb streaming behind it as it flew, and so attracting my attention.

All the nests I have found have been of the red-coloured felt-like texture, and I have seen none of the second type of nest described by Hume as being sometimes built by the Indian bird.

The breeding season is March to June and, I think, two broods are reared, sometimes in the same nest, as I found signs in one nest,

which contained three eggs, that a brood had already been reared in it.

The full complement of eggs is three and they are in every detail just duplicates of the preceding bird.

Twelve eggs average 15.3×11.5 mm. : maxima 15.9×11.8 and 15.1×12.0 mm. ; minima 15.0×10.8 mm.

Both birds assist in building the nest and we have trapped both sexes on the nest, so, presumably, the male also assists in incubation.

Anaimos percussus * Temm.

THE CRIMSON-BREASTED FLOWER-PECKER.

(1313) *Anaimos percussus ignicapillus* (Eyton).

THE MALAYAN CRIMSON-BREASTED FLOWER-PECKER.

Prionochilus ignicapillus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 437.

Anaimos ignicapillus, ibid. vol. viii, p. 668.

This beautiful little Flower-pecker only occurs within our limits in Tenasserim, whence it extends throughout the Malay States to Sumatra and Borneo. East it is found in South-West Siam. So far as is recorded it is a bird of forest and well-wooded areas and breeds on high trees.

The only nest of which I have any record is one taken by Major J. C. Moulton on the 23rd April at Kuching, Sarawak, Borneo, which he sent me with the one egg it contained. The nest in composition, shape etc. is halfway between those of *Dicaeum* and those of *Piprisoma*. The shape is very much like that of the nest of *Dicaeum* but more pear-shaped and less oval, the upper end being drawn out where it is fastened to the pendent twig. There is no porch, but the entrance has a protruding rim all round just like that generally present in the nests of *Piprisoma*. The chief material used is a reddish down, less compacted than in the nests of that bird yet much more closely than in the nests of *Dicaeum*. It is further lined with fine roots etc., and all over outside there are decorations of caterpillar excretæ, scraps of lichen, moss, roots etc., just as in the nests of *Leptocoma* but much more neatly arranged. The lining is a pad of the same soft red vegetable-down as that composing the walls of the nest.

The measurements are externally nearly 4 inches high by $2\frac{3}{4}$ broad, internally about 2 by 2 inches.

The circular entrance is about an inch in diameter. It was said to have been attached to the end of a branch of a weed about 6 feet from the ground.

The single egg in the nest is pure white, not greyish-white as the eggs of *Dicaeum*, but of the same texture. It measures 13.1×10.0 mm.

* Kloss considers *ignicapillus* to be only a race of *A. percussus* Temm., 1826. This seems to be quite correct.

Suborder ANISOMYODI

(PITTAS and BROADBILLS).

Family PITTIDÆ

(PITTAS).

(1316) *Anthocincla phayrei* Blyth.

THE EARED PITTA.

Anthocincla phayrei, Fauna B. I., Birds, 2nd ed. vol. iii, p. 442.

This very handsome bird is found in Burma East of the Sittoung River, Shan States, Siam and Tenasserim. It is a forest bird, being found both in the dense evergreen- and in thinner deciduous forest, at all elevations between about 1,500 and 6,000 feet.

In 1881 Bingham found a nest of this Pitta, since when no other collector has taken it. Bingham thus records his find (Hume's 'Nests and Eggs,' vol. ii, p. 279) :—"Right up among the hills, and in dense evergreen-forest, the Meplay, the largest tributary of the Thoungyeen, takes its rise. On the 27th of April this year (1881) I pitched my camp at the Karen village of Hporrlai, and in the evening strolled round with my gun. On the side of a deep bank covered with evergreen-bushes I saw something moving, which I first took to be a rat, but presently made out to be a Pitta of some kind scratching among the leaves. Breathlessly waiting, with gun at full cock, I watched the bird for full ten minutes. At last it came well in sight and I recognized it as a male of this species. I fired, knocking the bird over, and to my astonishment flushed another. It flashed on me that these were a pair and that there might be a nest, and sure enough a little search showed me a compact little oven-nest, made on the ground at the foot of a tree, of leaves, roots and grass, containing four eggs. The entrance to the nest was at the side looking down the steep slope on which it was built, and having a firm little platform of sticks leading up to it. The interior of the nest was lined with fine black roots. The eggs are glossy white, spotted chiefly at the larger end with purplish-black. They measure 1.10×0.88 , 1.08×0.85 , 1.09×0.85 and 1.10×0.86 . I tried to remove the nest, but notwithstanding the utmost care, it tumbled to pieces."

Hume adds that the eggs are broad, rather pointed ovals and of the usual hard glossy white of most Pittas' eggs and quite typical of the family.

(1317) *Pitta nepalensis* (Hodgs.).

THE BLUE-NAPED PITTA.

Pitta nepalensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 444.

The Blue-naped Pitta is found throughout the Lower Himalayas from Eastern Nepal to the extreme East of Assam: it is common in Manipur, Looshai Hills, Hill Tippera and the Chittagong Hill Tracts in Eastern Bengal and further East to the Chin Hills and Northern Arakan Yomas or hill-ranges. It is most common between 1,500 and 3,000 feet, but occurs up to 6,000 feet as a breeding resident, while it may also occasionally breed down to the foot-hills in Dibrugarh.

Hume took its nest near Darjiling at about 4,000 feet and Gammie at 5,000 feet in the Cinchona-reserves, the latter in dense scrub. In Assam it was a common bird and we saw numerous nests, these being built in very different kinds of country. They never breed in the open or in grass-lands, however high the grass may be, otherwise they do not seem to mind much what the cover is. Probably they prefer dense secondary growth in deserted cultivation and next to that open bamboo-jungle without much undergrowth. I have, however, taken nests from dense evergreen-forest, deciduous and thin forest and from bush and scrub growth on rocky hill-sides.

Most nests are built on the ground but others are constructed on trees, generally only a few feet up but, rarely, as high as 20 feet. When on the ground the nests are very loosely and untidily put together, great domed affairs, shaped like Rugby footballs and made of bamboo-leaves, grass and coarse roots, with an entrance at one end. The lining, if present, consists of roots very roughly placed at the bottom of the nest. It is quite impossible to move the nest from its original position, as it falls to pieces directly it is touched. The nest is sometimes hidden in among bushes and brambles on the hill-sides or in ravines, or it may be built in among the roots of bamboos but, usually, it is quite in the open, though so buried in bamboo-leaves and fallen debris that it is very inconspicuous. Indeed, the first nest I ever found was when I kicked a supposed accumulation of bamboo-leaves and was surprised to see a Pitta emerge from it and disappear with long hops, like a frightened rat. When made on trees it is a little better put together and consists more of fern-fronds, roots, grass-blades and weed-stems which, to some extent, help to keep the bamboos, dead leaves and other miscellaneous items in place. Even so the nests will hardly ever bear removal, and look far more like chance heaps of rubbish caught in a branch rather than birds' nests. These tree-nests are generally built in stout forks of two or more upright boughs or in among a tangle of branches, while, often, the nests are built on platforms of rubbish placed by the birds in convenient positions on which the nests may rest.

In size the nests may be as much as 12 or 15 inches the long way by 9 to 12 across the shorter axis. The internal cavity is generally some 5 or 6 inches each way, but it is, like the outside, very untidy.

The great majority of birds lay in May and June but, at the lower levels, a fair number of eggs may be found in April. I have taken fresh eggs up to the end of August and, probably, a majority of birds have two broods in the year.

The normal full clutch of eggs is four, but five is not uncommon and even six may be found occasionally.

The eggs are exceptionally constant both in colour and character. The ground is a glossy china-white sparingly spotted with primary markings of reddish-brown and secondary ones of lilac or lavender-grey. The spots are nearly always more numerous at the larger end and often very scanty at the smaller. Very exceptionally the spots become small blotches, while still more rarely there are a few lines and hieroglyphics scattered among the spots at the larger end. A rather unusual type has the primary markings very pale reddish hardly any darker than the lilac secondary ones, both being rather numerous over the whole surface, giving the impression of a lilac-marked clutch. Looked at as a series they are handsome eggs, very spherical, very glossy white, boldly but sparsely spotted.

One hundred eggs average 29.5×22.4 mm. : maxima 32.4×24.1 and 31.2×25.6 mm. ; minima 26.1×23.3 and 28.0×21.8 mm.

Both birds take part in building the nest, but I cannot say whether the male does anything more than bring the materials, as I have never seen him placing them in position. Both birds incubate and the male seems to do his full share of this work.

Incubation, I think, takes seventeen days. A nest found on the 14th May with four eggs had five young, apparently just hatched, on the 2nd June.

The birds return year after year to the same site for nesting, and a pair inhabited a nullah close to my house in Gunjong, building a nest every May in almost exactly the same spot under some small bamboo-clumps. This pair, presumably the same, was known to me for ten years, each year having two broods, the first egg being invariably laid on the 4th to 6th May, while the number laid was always four. Unfortunately I was nearly always away during a great part of May each year Gaur-shooting, so that I was unable to watch the progress of building and hatching.

(1318) *Pitta oatesi* Hume.

THE FULVOUS PITTA.

Pitta oatesi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 446.

The range of this *Pitta* overlaps that of the last in Arakan, while possibly both also occur in the Lower Chindwin ; the present bird

occurs at least as far South as Perak in the Malay Peninsula and is common in Tenasserim. In the East of Burma it occurs from the Kachin Hills and the Southern Shan States to Tenasserim.

I can find no account of the breeding of this fine Pitta, but notes sent me, with the remains of nests, eggs and birds all describe the nidification as exactly like that of *P. nepalensis*. Partridge obtained several nests for me near Amherst in Tenasserim in April 1899; Kellow sent me one clutch of eggs from Taiping with a hen bird taken on the 2nd January in a bamboo-clump about 3 feet from the ground; Graham obtained nests in April and May near Bassein, and Macdonald many nests near Tavoy in March. All describe the nests as being the same unwieldy balls of bamboo-leaves and grass built by the Blue-naped Pitta but, in every case except one, the nests were built on the ground in dense evergreen-forest and never on trees. The one exception was that taken by Kellow, which was in a clump of bamboos, one of half-a-dozen or so on the outskirts of evergreen-forest.

March to May seems to be the normal breeding season for this Pitta, and Kellow's January nest appears to be unusual in date as well as in position.

The eggs, four to six in number, are indistinguishable from those of the Blue-naped Pitta.

Forty-four eggs average 28.5×24.3 mm.: maxima 31.3×25.2 mm.; minima 25.9×24.0 and 27.0×23.0 mm.

Pitta cyanea.

THE BLUE PITTA.

(1320) *Pitta cyanea cyanea* Blyth.

THE ARAKAN BLUE PITTA.

Pitta cyanea cyanea, Fauna B. I., Birds, 2nd ed. vol. iii, p. 448.

This lovely bird is found in the lower Outer Himalayas from Bhutan to Eastern and Southern Assam. It occurs in the Tippera, Lushai, Chittagong and Chin Hills and Manipur, and thence in the hill-ranges of Burma from the Shan States to Tenasserim. It is also a resident of Siam, its place further East in Annam and Laos being taken by *P. c. willoughbyi* of Delacour.

This Pitta is throughout much of its area a plain's breeder as in Siam and many parts of Burma, where, however, it seems to be everywhere rare. In the hills South of the Brahmapootra and in Dihrugarh it was common, and in Cachar was found breeding up to the summits of the highest peaks over 6,000 feet. It is almost entirely a forest bird, and most of the nests I have found have been in very wet evergreen-forest and, in most cases, forest in which the ground was much broken up by steep precipitous ravines and outcrops of rocks and boulders, the latter all covered by the most

luxuriant growth of moss, ferns and orchids. Unlike the nest of the preceding Pittas, the nest of the present species is often built on old stumps, the tops of rocks and on steeply sloping banks, and is very seldom placed on the ground almost, or quite, in the open. At the same time I have occasionally seen the nest in scrub or in bamboo-jungle, provided this latter has ample undergrowth. I have taken nests absolutely unconcealed in any way, perched on the top of a rock or on a dead stump, conspicuous for all the world to see, yet safe from the fact that they are so unlike nests that no one would recognize them as such.

They are typical Pittas' nests, great oval balls of a foot in length by rather less in breadth, and constructed of all kinds of dead leaves, roots and rubbish. They are more compact and better built than those of the Blue-naped or Fulvous Pittas, yet are still too loosely put together to stand handling. Where bamboo-leaves are available these form the favourite material, birds often travelling far to obtain them, but bracken, grass, roots and even moss and lichen are used in considerable proportions. The outer parts of the nest are often soaked through, but the interior always seems snug and warm. When built on the ground they are often placed on beds or platforms of dead leaves, and have little platforms of sticks and leaves making a runway up to the entrance. One of these is well described by Herbert (*Journ. Nat. Hist. Soc. Siam*, vol. vi, 1924):—"The nest was situated on the ground at the foot of a bank and near to a clump of bamboos. It had a domed top with the entrance at the side, and was built on a platform which extended about four inches in front of the entrance. The nest was built of dry bamboo-leaves and the platform consisted of wet ones which were firmly matted together; the latter measured twelve inches in width and three in thickness. Later I saw other similar nests."

Everywhere the breeding season seems to be the same—May, June and July. My own eggs have been taken on dates from the 6th May to the 20th July.

The eggs are glossy white, very broad ovals, like those of all other Pittas, but are much more profusely speckled or spotted than those of the Blue-naped or Fulvous Pitta. The markings consist of specks, spots or small blotches varying in colour from pale reddish to deep purple-black. In some eggs the secondary grey or lilac markings are as numerous as the primary and give a lilac tinge to the whole egg. I have one very handsome clutch which is profusely covered, almost mottled, with fairly dark reddish and with pale lilac; another is exceptionally, boldly spotted with purple-black, and yet a third, equally handsome, sparingly marked with dark reddish and profusely with blotches, some quite large, of lilac-grey. In a very few eggs only are the markings obviously more numerous at the larger end and in none do they form rings or caps.

Fifty eggs average 27.6×20.9 mm.: maxima 28.2×22.1 mm.; minima 24.0×21.3 and 25.2×20.1 mm.

(1321) *Pitta moluccensis* Müller.

THE LESSER BLUE-WINGED PITTA.

Pitta moluccensis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 450.

This *Pitta* extends from South Arakan, through the whole of Burma, the Malay States, Sumatra and Borneo. East it is found in the Shan States, Eastern Burma and Siam.

The bird is one of jungles and forests, all the notes I have had on its nidification describing the situations in which the nests are found as thick cover of some sort.

Mackenzie, in letters and notes to me, gives the following description of its breeding habits. Writing from Prome he records :— " This *Pitta* is not uncommon in this district, though it is unequally distributed. I know one patch of jungle—of course a large one of several square miles in extent—in which there are many pairs of birds breeding ; elsewhere in similar patches, both large and small, one only comes across a single pair. They keep much to fairly heavy forest or else to bamboo-jungle and dense scrub, and I found one nest within 200 yards of a village and rest-house but still in forest. They are particularly fond of banks of streams, both tiny streamlets of only a few feet in depth which work their way through deep forest, the vegetation meeting overhead, or the larger streams, which mean open air and sunlight. The majority of our nests were taken from the banks of these streams, often in Teak-forest where there was not much undergrowth other than bamboo and thin bush.

" The nests are large balls, rather longer than broad, built of bamboo-leaves, grass, dead leaves and roots, very carelessly and untidily put together and measuring over a foot in length by nearly a foot in breadth ; there is no true lining and the entrance is at the side and nearly always facing the streams when it is built on a bank."

Mackenzie makes no mention of a platform in front of the entrance, but Herbert saw nests in Siam which had platforms exactly like that he describes as in front of the nest of the Blue *Pitta*.

Davison, who was the first to find the nest of this *Pitta*, gives a similar description of the nest, as does Oates, who took some nests in Pegu. The latter, however, found one nest built on a tree-trunk " where the tree separated into three branches, about two feet from the ground." All the other nests, as well as four taken by Bingham in Tenasserim, were built on the ground. Measurements given for various nests show them to have been between 6 and 10 inches in length, between 5 and 8 high and the same in breadth.

Macdonald took one nest " near Rangoon " on the 17th April, but with this exception all nests have been taken within the dates given by Macdonald, *i. e.*, c./5 fresh taken on the 25th May and an incomplete clutch of three seen on the 5th August.

The eggs number four to six and Mackenzie once found seven. They are just like those of the Blue *Pitta*, perhaps a little more

densely marked as a series and with less variation between the extremes. A good many eggs are marked with broad or fine twisted lines as well as with the spots and specks.

A single clutch taken by Mackenzie is white handsomely blotched at the large end with deep purple-black and lavender and almost immaculate elsewhere.

One hundred and nine eggs average 26.25×21.3 mm.: maxima 28.9×22.1 and 28.3×22.9 mm.; minima 24.0×20.4 and 25.2×20.0 mm.

(1322) *Pitta megarhyncha* Schleg.

THE LARGE-BILLED BLUE-WINGED PITTA.

Pitta megarhyncha, Fauna B. I., Birds, 2nd ed. vol. iii, p. 452.

This *Pitta* is found within our limits only in Tenasserim and also in the Malay States and the island of Banka.

Hume has the following footnote on the breeding of this bird:—Mr. Darling found the nest of this *Pitta* at Taprah in the island of Tongkah, not far South of Tenasserim. This was on the 17th April. The nest was of the usual type and contained no eggs. The female to which the nest belonged, however, proved on examination to have a fully formed egg within her."

The egg is described as follows:—"The ground is white, with a faint lilac tinge, and it is richly but not very thickly streaked and mottled everywhere with dull maroon and pale inky-purple." It was too broken to measure, but was said to be of a glossy texture and broad, short, oval shape.

(1323) *Pitta brachyura* (Linn.).

THE INDIAN PITTA.

Pitta brachyura, Fauna B. I., Birds, 2nd ed. vol. iii, p. 453.

This, the best-known form of *Pitta*, has a wide range, being found over practically the whole of India from the sub-Himalayas to Ceylon, though it does not breed in that island. It is common in Assam, extreme Eastern Bengal and Manipur. It does not occur in Sind nor in the desert parts of Rajputana.

Osmaston records it as coming in great numbers as far West as the Jumna, and Donald found it breeding in the Kangra Valley (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 423, 1919).

At the time Hume's 'Nests and Eggs' was written the only person known to have obtained the nests or eggs was Blewitt, who, according to Hume, took a "vast number in the neighbourhood of Raipur, Central Provinces." Since then many collectors have taken the eggs. Davidson found many in Kanara and Betham took many more near Mhow. In the Surma Valley also it was very common but, whereas in India generally it is a bird of comparatively

thin forest without much undergrowth, here it haunted forest which was often very dense.

Unlike other Pittas, this bird, more often than not, builds its nests at a considerable height from the ground. Betham (*loc. cit.* vol. xix, p. 388, 1910) gives an interesting description of their nests:—"I had not proceeded very far when I saw an untidy mass of twigs in the fork of a teak-tree, with absolutely no concealment, about 12 feet off the ground. I did not think much about it, but as it was so accessible, I told my orderly to go up and investigate. To my intense pleasure and surprise, as he began to climb, out flew a Pitta and my search was rewarded. The nest contained six partially incubated eggs. I had the nest taken down and examined it. First a mass of sticks is collected forming a foundation, on this the nest proper is built up, it is compact and domed, oval in shape, with the entrance at one side. All the material is welded together, skeleton leaves being largely employed. The interior is neatly finished off and lined with roots, grass and such-like. The whole structure is about the size of a man's head and placed, as those were that I found, on a low fork they are not difficult to see."

Other nests found by Betham were similar in size, construction and site. Ollenbach obtained for me a fine series of nests and eggs in Jamalpur. Here also they were invariably placed on trees, Sál-trees (*Shorea robusta*) being nearly always chosen, at heights from 10 to 30 feet from the ground. In Assam I found nests both on the ground and in trees. The nests were very similar to those described by Betham, but I should not have called any of them "compact," as they nearly always fell to pieces when taken from the tree, while those on the ground were still more roughly put together and would stand no handling, though not as flimsy as the bamboo-leaf nests of the Blue-naped Pitta.

The nests taken by myself and Ollenbach averaged about 8 inches in length by about 6 in width and height. In trees the platforms were often massive but, on the ground, generally meagre and sometimes dispensed with altogether.

Everywhere the breeding season is from the end of May to the end of July, though I took one nest at Gowhate on the 27th April and another in Cachar on the 14th August. Both these dates are, however, quite exceptional.

The eggs number four to six and are very like those of the Blue-winged Pitta but are not quite so beautiful as a series. In most eggs the markings are of the same colour and character as in the eggs of that bird, but I have very seldom seen any with lines on them, and in three out of four clutches the spots are sparse everywhere except at the large end. Occasionally in a clutch, otherwise quite normally marked, there is one egg with a big blotch about 4 to 6 mm. across.

Fifty eggs average 24.7×21.2 mm.: maxima 28.2×21.1 and 27.1×22.4 mm.; minima 23.3×21.0 and 24.9×20.0 mm.

Both sexes incubate, but I cannot say whether the cock assists in building.

Pitta cucullata.**THE GREEN-BREASTED PITTA.**(1325) **Pitta cucullata cucullata** Hartl.**THE GREEN-BREASTED PITTA.***Pitta cucullata cucullata*, Fauna B. I., Birds, 2nd ed. vol. iii, p. 455.

This beautiful bird occurs in the Outer Himalayas and the Terai from Nepal to extreme Eastern Assam, while it also breeds in some places, such as Gonda, in the plains of the United Provinces. It is found in the districts of Eastern Bengal, North and East of the Bay, and thence throughout the whole of Burma to the Malay States and Siam.

It breeds in the foot-hills and adjacent hills and up to at least 6,000 feet, frequenting forest of all kinds, the deepest and wettest as well as the driest and thinnest, while it may also be met with in bamboo-jungle, scrub-jungle and in crops, such as mustard and rice, or in cultivation outside forest.

The nest is nearly always placed in thick cover, the favourite site, perhaps, being under bamboo-clumps in heavy tree-forest. I have, however, seen nests in thin scrub-jungle, matted secondary growth and in open bamboo-jungle, though the last is very rare. I have also found it breeding in dense grass, with patches of forest scattered here and there. Like most Pittas, they are fond of breeding by water, small streams and wet ravines in tree-forest often containing nests on their banks. The nests are always, I think, placed on the ground and never, so far as I am aware, on trees like the nest of the Indian Pitta. In construction they are much the same as those of other Pittas, oval balls of bamboo-leaves, grass etc. very loosely put together and lined with grass and leaves. Some nests, however, have much more mixed material in them. One I have seen was made almost entirely of moss, some green and some dry, mixed with leaves, twigs and grass and comparatively well lined with roots and skeleton leaves. At the same time bamboo-leaves are undoubtedly the favourite material, and I have seen nests made of these although the birds had to fetch each leaf from a distance of over a quarter of a mile. No nest is sufficiently well built to allow of handling or of removal from the original site; even the entrance and exit of the bird through the very wide entrance always seems to be attended with the danger of the whole structure coming down. Most, if not all, of the nests I have personally taken have measured about 8 to 10 inches long by 6 to 9 inches broad, some being almost spherical. Hodgson describes the nest in Nepal as spherical and as measuring 6.75 inches each way; Cripps speaks of one only 5 inches either way and, surely, abnormal, while one found by Davison was 9.5 in height by 10 inches in length, with an entrance 3 inches across.

They must, I think, build very quickly, as on one occasion I saw a pair of birds busy running about with material, though no signs of nest were visible, yet, returning three days later the nest was practically finished, and in ten days from the start contained five fresh eggs. When I first saw them the nest had not been begun, though both birds were running about in a most excited manner carrying bamboo-leaves. Sometimes after the completion of the nest a little stage is erected for the birds to run up from the ground to the entrance of the nest. This may be from 4 to 8 inches wide and at the higher end as thick as 3 inches. At other times a platform for the nest with entrance-ladder is made before the nest is begun and is then occasionally quite substantial.

The breeding season is May, June and July in Assam and I have taken eggs from the 24th April to the 8th August. In Nepal and Sikkim Hodgson gives April and May as the two breeding-months. Cripps took a nest in Sylhet on the 25th May, while Davison secured another on the 12th July near Amherst. In Siam they seem to be very late breeders, Herbert taking the nests in the end of July.

The eggs, four or five in number, cannot be distinguished from those of the Indian Pitta but, as a series, a greater percentage of eggs are marked over the whole surface equally and not only at the larger end. They are, of course, of the usual hard, glossy white and very spherical.

Fifty eggs average 27.1×21.0 mm. : maxima 28.0×22.0 and 25.8×22.5 mm. ; minima 23.0×22.0 and 25.6×19.6 mm.

Both birds incubate and both assist in building the nest. They sit, like all Pittas, very close and only leave when the nest is almost trodden on, while if quiet is maintained the bird will return almost at once even if the watcher is in view. Once standing about ten yards from a nest, but quite exposed, both male and female returned to the nest and were secured within five minutes of our finding it.

(1327) *Pitta gurneyi* Hume.

THE BLACK-BREASTED, OR GURNEY'S, PITTA.

Pitta gurneyi, Fauna B. I., Birds, 2nd ed. vol. iii, p. 457.

This Pitta is found in the Tenasserim and Siamese Peninsula to Malacca and is resident wherever found, so that it certainly breeds in Tenasserim. The only nest taken, however, is one by a Dyak collector of Herbert's who shot the bird as it flew from the nest. This contained four eggs, and a fifth, fully formed and coloured, was taken from the oviduct of the bird shot, which is now in the British Museum.

Herbert, in giving me this clutch, writes :—" This nest, taken on the 9th October, at Klong Wahip, Peninsular Siam, was made of dry bamboo-leaves, domed, with an entrance on one side, and placed on the ground at the foot of a bamboo-clump.

"The eggs are spherical ovals, with both ends alike, glossy creamy-white ground, spotted and freckled more or less evenly all over with inky-purple, almost black in some places and very pale in others. There are no angular scratches or writings."

The eggs vary in size between 25.3×22.0 mm. and 27.0×22.4 mm.

They can be matched with many eggs of the Indian and of the Green-breasted Pitta, though they are exceptionally freely and darkly spotted.

Family EURYLAIMIDÆ

(BROADBILLS).

Eurylaimus javanicus.

THE PURPLE-HEADED, or HORSFIELD'S, BROADBILL.

(1328) *Eurylaimus javanicus javanicus* Horsf.

THE PURPLE-HEADED, or HORSFIELD'S, BROADBILL.

Eurylaimus javanicus javanicus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 461.

The present species is found over East Central and South Burma from Karenni to the Malay States, Java and Sumatra. East it occurs in Siam.

It is a bird of forest and open country alike, also frequenting gardens, parks and the surroundings of villages.

Waterstradt obtained several nests in Perak and in East Malacca, while Grubauer obtained two nests with eggs near Perak, and I have also had nests sent me from the latter place, though, unfortunately, they were only old deserted nests.

In shape they were gigantic editions of the pear-shaped nests of the Purple Sunbird, varying in size from 2 to $3\frac{1}{2}$ feet long (according to the length of the oddments hanging below) by about 10 to 18 inches broad. They are made of a most miscellaneous mass of materials, almost anything which can be picked up in forest or jungle being made use of. Twigs, grass, roots, leaves, weed- and creeper-stems, moss, both dead and fresh, are all interwound together with bamboo- and skeleton leaves and shaved into a huge pear, sometimes with the neck drawn out considerably, at other times with hardly any neck at all. The entrance is generally about two-thirds of the distance from the bottom and is overhung by a huge, roughly-made porch of twigs, leaves and grass which completely conceals it. Outside the whole nest are bung caterpillar excretae, cocoons, leaves and a variety of scraps of lichen, moss etc., often hanging by cobwebs well away from the nest, while below streams out a long tail of similar articles. The body of the nest is very strongly made, and even the old used nests sent to me had to be

violently torn apart to show all the oddments of which they were made.

Davison, who took a nest of this Broadbill in Tenasserim on the 21st March, describes it as just like those sent to me, and says that it was suspended from the tip of a bamboo overhanging a stream. He does not mention any porch over the entrance to this nest, which contained two fresh eggs.

There seems to be nothing more on record about the nests, but those sent me had, like that found by Davison, been taken from the ends of branches of trees hanging over streams at heights between 10 and 20 feet.

The few nests found containing eggs have all been taken between the 23rd March and the 7th May. What constitutes a full clutch is not known. In my series I have one clutch of three and the rest are twos or single eggs, but it is quite possible that they lay more than this, as most Broadbills lay rather large clutches.

The eggs have a white glossless ground and are speckled and spotted, most thickly at the larger end, with deep purple or pale reddish.

In shape the eggs are rather long ovals, some distinctly pointed, others almost elliptical. Hume says that there is no other egg for which they could be mistaken, but I have seen eggs of some of the *Dicruridae* which very closely resemble them.

Ten eggs average 27.0×18.8 mm.; maxima 28.0×19.7 and 27.9×20.0 mm.; minima 26.1×17.1 mm.

(1329) *Eurylaimus ochromalus* * Raffles.

THE BLACK-AND-YELLOW BROADBILL.

Eurylaimus ochromalus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 463.

This Broadbill occurs in Peninsular Burma and Siam, the Malay States, Sumatra and Borneo.

* According to Robinson ('The Birds of the Malay Peninsula,' vol. ii, p. 164, 1927) this species is "a more sociable and familiar bird than the larger Broadbills. It is often found in the environs of villages or at the edges of the jungle and in clearings, nor does it seem so tied to water as most of its allies. It ascends the hills to about 2,000 feet but not higher."

Mackenzie is apparently the only collector who has taken the eggs of this Broadbill. The eggs, now in my collection, were accompanied by the following note:—"Nest found in the Ngaween Reserve, at the head-waters of the little Tenasserim River (Mergui). It was supported in a loop of cane, and was made of moss, fungus, mycelæ

* This Broadbill has been separated into geographical races, but on the material available I can find no distinctions sufficing for the purpose. I leave them, therefore, under the binomial.

and skeleton leaves outside, lined inside with roughish grass-roots, with bamboo-leaves and leaf-stalks inside it all. The nest was comparatively small and compact. The outside measured 7" long, 5" broad one way and 4' the other, the walls about $1\frac{1}{2}$ " thick and the entrance about $2\frac{1}{4}$ " by 2".

"The nest has no porch but a sort of projecting step below the entrance.

"It contained two eggs, very like those of *Serilophus*, white with black spots, measuring 23.5×17.0 and 23.5×16.5 mm."

Corydon corydon.

THE DUSKY BROADBILL.

(1330) *Corydon corydon corydon* (Temm. & Laug.).

THE SUMATRAN DUSKY BROADBILL.

Corydon sumatranus sumatranus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 464.

Corydon corydon corydon, ibid. vol. viii, p. 668.

The present species only comes within our limits in Tenasserim, whence it occurs South to Sumatra and East to Siam, Annam and Cochin China.

The Dusky Broadbills are inhabitants of very dense evergreen-forest from the plains up to some 4,000 feet or, perhaps, 1,000 feet higher. Occasionally, however, it may be met with in thinner forest or in secondary jungle, but it never haunts cultivation or the vicinity of villages. Like all Broadbills, it seems to especially affect the banks of streams and rivers running through high tree-forest.

In 1909 and 1913 Kellow took a very fine series of the nests and eggs of this bird, which he presented to me. One nest was taken "near Perak," the others "on the hills adjoining Taiping and Simpang, all between 2,000 and 4,000 feet." The nests sent to me were typical Broadbills' nests—huge, pendent structures, pear-shaped like those of the genus *Psarisomus* but still bigger. Some are as little as 3 feet in length and less than 2 in breadth, but one huge thing taken by Hopwood was 7 feet from top to bottom, this including the long hanging tail and the drawn-out neck to the pear. The first nest ever taken, one by A. E. Butler on June 20th, 1898, was also "just short of 7 feet in total length." The entrance is about one-third down the body of the nest and is overhung with a large porch, constructed of the same materials as the body of the nest. These include grass, twigs, roots, bamboo-leaves, dead leaves of all kinds; weed-stems and creeper-stems, often with the leaves still on, with a medley of everything else one can obtain in dense jungle. These materials are really well, compactly and strongly put together, but the birds hang outside the true nest a miscellaneous assortment of caterpillar excreta, cocoons and spiders' egg-bags, leaves etc., sticking out in all directions and also hanging

below in a long, loose tail which may measure over 2 feet in length. The lining is of green leaves.

Of three nests, of which details were given, two were hanging from pendent branches of trees over a stream and a third, similarly, over a little pool of water. These were between 15 and 30 feet from the ground, but the one taken by Hopwood was 40 feet from it. A nest found by Robinson near Pahang and one taken by Hopwood at 4,000 feet on Nwalabo Mountain were very similar in construction, but that taken by the former was lined with strips of palm-leaf.

The breeding season is from December (Robinson, three hard-set eggs) to April, though Hopwood found one nest in June with two eggs.

The full clutch of eggs is three or four, two only being sometimes incubated.

The ground-colour varies from a creamy-pink to a strong buff. Most eggs are rather densely covered all over with reddish freckles and small irregular blotches of the same colour, the general impression being obtained of a dull brick-red egg; a few are marked less densely, except at the larger end, where they sometimes form caps or rings. As a rule one can hardly see the secondary blotches of pale reddish, but these, as well as others of lilac, are very noticeable in one egg of the pair taken by Hopwood.

In shape the eggs are broad, almost elliptical ovals, the texture coarse and the surface smooth but glossless.

Twenty eggs average 29.4×22.2 mm.: maxima 24.9×24.0 mm.; minima 27.2×22.0 and 29.8×20.6 mm. The eggs taken by Robinson averaged 30.5×24.1 mm.

Cymbirhynchus macrorhynchus Gmelin.

THE BLACK-AND-RED BROADBILL.

(1331) *Cymbirhynchus macrorhynchus malaccensis* * Salvad.

THE MALAYAN BLACK-AND-RED BROADBILL.

Cymbirhynchus macrorhynchus macrorhynchus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 406.

Cymbirhynchus macrorhynchus malaccensis Salvadori, Atti R. Acad. vol. ix, p. 425, 1874 (Malacca).

As now restricted this form of the Black-and-Red Broadbill is found over Tenasserim, Southern Siam, Annam and Cambodia, South to Singapore. This is a bird of the plains and sea-level, though it occurs in the mountains up to some 1,500 feet according to Robinson.

* I am still extremely doubtful as to whether this form should be maintained, but Robinson, who had for better material than I on which to work, considers it separable though "almost identical."

It is one of the most common of Malay Broadbills and is found not only in forest of almost any kind but in the vicinity of towns and villages and even in gardens and orchards. It also frequents Mangrove-swamps and often breeds in these latter.

Robinson ('Birds of the Malay Peninsula,' vol. ii, p. 161, 1927) says:—"In the Malay Peninsula the breeding season is from April to July or even later. A nest found by me in the interior of the Patani States on 22nd July was in secondary jungle, suspended from the projecting limb of a small tree about 8 feet from the ground, and looking like a mass of debris left there by a flood. The nesting chamber was formed in the upper portion of an elongate oval about 11 in. long and 15 in. in its greatest circumference, and was entered by a circular hole furnished with an eave. The materials were palm-fibres, twigs, creepers and aerial roots, with a few leaves. The inside was neatly lined with grass, and the eggs, three in number, were deposited on a bed of fresh green leaves. The nests are usually suspended over ponds or streams, generally the latter, at a variable height from the ground, not more than about 20 feet—sometimes as little as 8 or 10 feet. As a rule they are hung to the end of an aerial root or creeper, but sometimes they are attached above its termination. In the upper reaches of the Tahan river the nests were especially common, every hundred yards or so, together with those of the Larger Dusky Broadbill."

To the above one must add that the nests are also sometimes built in Mangrove-swamps quite close to the sea. One set obtained by Coltart from the Waterstradt collection was accompanied by a note in German recording that "All our nests were large hanging affairs made of sticks and stems of plants mixed with grass, moss, leaves and roots. In shape they were round, with the hanging end drawn out. They were attached to the hanging branches of trees standing in swamps or at the edge of these."

Hopwood says that the nests are usually lined with green leaves, which, however, are not renewed during incubation.

The breeding season is a long one, as Hopwood took nests and eggs from early March to August and Davison found a nest with young in the latter month.

The eggs number two or three and are very like those of *Corydon* but much smaller. The majority of eggs have the ground a pale dull salmon, freckled all over with pale reddish-brown or rather dark reddish-brown, in some eggs the freckles becoming larger and blotchy. The markings coalesce nowhere but are rather more numerous at the larger end. Another type has the ground creamy with the range of markings much the same as in the first type, while a third type is tinged with claret marked with deep claret-red.

In shape the eggs range from broad short ovals to long blunt ones. The texture is not fine and the surface is quite glossless.

Twenty-four eggs average 26.8×18.8 mm. : maxima 29.3×18.8 and 25.7×20.7 mm. ; minima 25.0×20.0 and 25.6×18.2 mm.

I have no information as to whether the male shares in the incubation, but as he has been disturbed from the nest and then shot it is to be presumed he does. Hopwood noticed that at some half-built nests both birds were about, apparently building.

Serilophus lunatus.

THE COLLARED BROADBILL.

(1333) **Serilophus lunatus lunatus** (Gould).

THE PEGU COLLARED BROADBILL.

Serilophus lunatus lunatus, Fauna B. I., Birds, 2nd ed. vol. iii, p. 469.

This very pretty Broadbill extends from Pegu, the Shan States and Karenni to the South of Tenasserim and Peninsular Siam.

The Pegu Broadbill is essentially a bird of evergreen-forests and is very seldom found in other kinds. Once Davison found a nest on the roadside on the outskirts of the village Om-ben-gwin near Tavoy, but this is exceptional, and Hopwood, Mackenzie and K. C. Macdonald, who found nests near Tavoy, all say that they were found in dense forest, though the birds selected partially open places such as village-paths, game-tracks and, above all, streams and pools of water over which the nest was built. They are found both in the forests of the plains and foot-hills and also in the hills up to some 3,000 feet and in smaller numbers up to 5,000 feet.

The nest is generally built at the end of some pendent branch of a tree or bush or from the end of a bamboo, and may be at any height from the ground between 3 and 30 feet. Probably the favourite height is between 5 and 10 feet.

The best description of the nest is that given by Oates (Hume's 'Nests and Eggs,' vol. ii, p. 201), who writes :—"The nest was suspended from the branch of a small shrub in dense evergreen-jungle. The nest itself is a ball about six inches in diameter exteriorly, with a circular opening two inches wide exactly in the centre. The entrance is protected by a wide porch. The materials are chiefly coarse grass and the outer bark of elephant-grass and weeds bound together by fine, black hair-like roots. The exterior of the nest is adorned with innumerable yellow cocoons. Towards the bottom of the nest the materials become very coarse and are loosely put together, the ends straggling down a foot or more, forming a long tail. The total length is nearly two feet. The interior of the nest is beautifully and finely lined with broad leaves of elephant- or thatch-grass, and a few green leaves are spread over the egg-cup. Altogether the nest is the most elaborate I have ever seen, differing in nothing but size from some of the many nests of *Arachnechthra flammoxillaris* that I have found."

The nests vary greatly in size. Davison found one measuring about 8 by 6 inches; Bingham took another at Myat-yo which was

about 10 inches long by 6 broad; Darling yet another, also in Tenasserim, the same in length but only 4 inches wide, a very exceptionally small nest. On the other hand, Macdonald saw one nearly 3 feet long. The materials vary according to whatever may be most handy, while the decorations seem to be added to the tastes of the birds. Cocoons, spiders' egg-bags and the excreta of caterpillars are certainly the favourites, but some birds use none of these and decorate their nests entirely with green moss and lichen, while others use all these with many other oddments. Always, however, the lining is of broad leaves such as elephant-grass, thatch, bamboo etc., with invariably a top layer of green leaves. The nests are very conspicuous, but may often escape examination on account of their resemblance to drift rubbish.

The breeding season is March to July and, during the latter month, Davison took nests in Tenasserim on the 11th and on the 28th found one from which the young had flown.

The full clutch of eggs is four or five. The ground is generally white but is sometimes tinged with very pale creamy-pink or claret-pink. Very rarely the eggs are spotless, but the great majority are speckled with tiny pin-points varying in colour from reddish-brown to deep purple-black. In most eggs these specks are more numerous at the larger end and in a few they are practically absent over the smaller third of the egg.

The texture is rather fine and close and occasionally has a decided gloss. The normal shape is a short, blunt oval, rarely rather lengthened but never pointed.

Thirty-eight eggs average 23.9×17.4 mm.: maxima 26.7×17.2 and 23.8×18.0 mm.; minima 22.25×17.25 and 22.6×16.3 mm.

(1334) *Serilophus rubropygius* (Hodgs.).

THE NEPAL COLLARED BROADBILL.

Serilophus rubropygius, Fauna B. I., Birds, 2nd ed. vol. iii, p. 470.

This species extends from Nepal and Sikkim to Eastern and Southern Assam. It also occurs in the hill-tracts of Tippera and Chittagong and the Looshai Hills and Manipur.

I have taken and seen so great a number of the nests of this bird that my own notes cover all that can be said, and the nest taken by Gammie in Sikkim at about 3,000 feet differed in no way from these.

The birds are resident and breed in the plains adjacent to the foot-hills and in the hills themselves up to about 5,000 feet, but are most common between 1,000 and 3,000 feet. I have never been able to detect any special liking of these Broadbills for any special kind of forest or jungle. I have seen their nests in tall evergreen-forest on the edge of streams over which the great trees met and shut out the light. I have taken others from thin forest with scanty undergrowth where the sun glinted through on foliage and nest. Some nests have been attached to the pendent ends of giant bamboos.

either in scrub and mixed jungle or in jungle consisting of bamboos only. Others have been attached to branches of bushes in scattered scrub-jungle, while yet others have been in canebrakes or on palm-trees and fern-palms. One thing, however, the birds do like—that is, the vicinity of water—and two nests out of every three will be found hanging from branches of trees, bushes or bamboos over water, running or stagnant. Even when not actually over water nests are often built in ravines and nullahs which are moist at the bottom and in which water soon runs after any shower.

The nests are exactly like those of the preceding bird and vary just as they do in size and in the materials used, both for the body of the nest and for decorative purposes. They are equally untidy outside and have tails consisting of all kinds of oddments, sometimes hanging a couple of feet below the nest; at the same time I should call the nest itself very compactly and strongly built. It is always fastened to a pendent support of some kind, to which it is very firmly attached, much material being passed round and round it, so that it requires a very powerful pull before it can be torn away.

This is one of the nests of which every one remarks it is so conspicuous that it is difficult to see how it can escape destruction, but the fact that it is *always* attached to very thin pendent supports defeats the attentions of monkeys and large lizards, which are among the worst thieves of eggs and young birds. I have myself seen a *Rhesus* monkey stretch over to the nest of a Long-tailed Broadbill until he had got nearly within grasp, and then come a purler into the stream below.

The breeding season is almost confined to May and June, a few birds also breeding in April and July. So far as I know they are not double brooded, though if a first clutch be taken they will at once make a second nest and lay again, generally close to where the first was robbed.

The normal clutch of eggs is four or five, but I have seen a few sixes and one seven. They are just the same in appearance as those of the Pegu Collared Broadbill, but both pure white and claret-tinted eggs are proportionately more numerous.

One hundred eggs average 23.6×17.3 mm.: maxima 25.0×18.2 mm.; minima 22.3×16.2 mm.

Both birds incubate, for we have often caught the male on the nest. Both sexes also assist to make the nest. They work only in the mornings and evenings for about three hours, roughly day-break to about 9 A.M., and again about 3 P.M. to sunset, even then breaking off to feed every few minutes. At the same time, considering its bulk, the nest takes a very short time to construct. I have never seen the work begun and completed, but I have seen many nests half made and then had to leave, while, on the other hand, I have seen some completed which were half made when found. From these I think it is safe to say the nest takes from five to ten days to build, the decorations often being added after the eggs are laid.

(1335) *Psarisomus dalhousiæ* (Jameson).

THE LONG-TAILED BROADBILL.

Psarisomus dalhousiæ, Fauna B. I., Birds, 2nd ed. vol. iii, p. 472.

This, perhaps the most beautiful of the Broadbills, has also the widest range. It is found in the Himalayas from Kumaon and Mussoorie to Eastern Assam. From that Province it extends East through the Hill districts of Eastern Bengal and through the whole of Burma and the Malay States, where, however, Robinson calls it a rare bird, not found below 2,700 feet. East it occurs in Siam and Annam and it is also a resident of Sumatra and Borneo.

During the breeding season it is a frequenter of evergreen tree-forest at all heights from the foot-hills up to 6,000 feet, breeding in greatest numbers between 2,000 and 4,000 feet. Its favourite resorts are undoubtedly ravines running through high tree-forest which have not much undergrowth but which have a stream down the centre or casual pools of water over which they can build their nests.

Hodgson gives a correct account of the breeding of this bird, but gives very small measurements for the nest, i.e., 9 inches long by 5 broad. Gammie took several nests similar to those taken by Hodgson but with the length and breadth 11 inches and 7 inches respectively, which is nearer the size of the very numerous nests I have taken myself. Again, Hume, who gives a detailed description of these same nests, says that they are devoid of all external decorations and streamers, whereas all that I have seen have been extravagantly decorated.

The nest is attached to a pendent branch of some small or big tree or the end of a drooping bamboo, where such a clump grows in what is otherwise evergreen-jungle. It may be at any height from the ground between 6 and 30 feet or even more. Gammie says that all the nests he found were built on trees so slender as to be unclimbable, but I have often found them on thin outer branches of immense trees. Even on these, however, the nests often cannot be taken except by cutting off the branch to which they are attached. Sometimes the nests are placed in curious positions, and H. D. Peile (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 361, 1915) records two attached to telegraph-wires stretched across nullahs, apparently in jungle. He comments on the fact that these nests were attached to the wire far more firmly than is shown in the text-figure which appeared in both editions of the 'Fauna' (Birds), and notes the attachment "consists of many more twigs and fibres." At the same time I should myself add that in some instances, most I think, the attachment is very like that given in the text-figure.

The nests vary extraordinarily in size; the ball which contains the egg-chamber may be anything from 9×5 inches (Hodgson),

which is quite exceptional, to 14×8 inches. The whole nest is pear-shaped, and the neck may be long and thin or short and stumpy, and I have seen one nest in which the branch went practically through the roof of the chamber, with no neck at all. Generally the neck is 4 to 6 inches long. The nest itself is very well and strongly made of all kinds of material, such as leaves, bamboo-spathes, grass, roots, moss, lichen, tendrils, stems of plants and bits of creeper etc., etc. These are well interlaced and it takes much force to tear them apart, but outside the true nest the birds add all sorts of articles which stick out in every direction and often hang many inches below the nest in a ragged tail. Including this tail most nests measure over 3 feet from branch to end of tail, and I have notes of one which was 4 feet 6 inches. At the other extreme I have a note of one "more like a *Serilophus* nest, no tail and measuring under a foot." For decorative purposes the birds are very fond of silk-cocoons, spiders' egg-bags, bright red or bright green leaves, scraps of vivid green moss, lichen and similar bits but, with these, are added long streamers of creeping plants, grass and roots. Spiders' webs are used in great quantities to assist in sticking on the decorations, while the longer bits are often woven into the fabric of the true nest.

The egg-chamber averages about 4 inches or rather more each way and is neatly lined with grass-blades, bamboo-leaves or roots, over which green leaves are often but not always laid. Sometimes I think the green leaves must be renewed again and again, as I have seen eggs which were almost hatching lying on perfectly fresh leaves.

In some suitable forests the birds are very numerous, and in 1909 I saw seven nests in a strip about 3 miles long and less than 1 wide, with a hill-stream rushing down the centre.

May and June are the two principal breeding months, but I have taken fresh eggs as early as 3rd April and as late as 24th August. This last was certainly a second brood, the first having probably been destroyed, for they are not usually double brooded. They breed yearly in much the same spot, and I have more than once found the remains of old nests quite close to the one occupied.

The number of eggs laid in a full clutch varies from four to eight, five or six being the most usual. They go through a very wide range of colour and, curiously, through almost exactly the same range as do the eggs of the common Black Drongo. Some eggs are pure spotless white, in others the ground ranges from white to a beautiful deep salmon-pink. In colour the markings consist of blotches of pale brick-red or brick-pink to a rich deep red-brown. On most eggs the blotches are of some size and are most numerous at the larger end and sparse elsewhere; in a few clutches the blotches are still bigger, more scanty and very irregular in shape. The secondary markings are of grey, lilac-grey or washed-out pinkish; as a rule

they are not prominent, but I have seen a few eggs in which they strike the dominant tone. As a series they probably form as handsome a collection as can be obtained from any one species.

The shape is a rather long oval, slightly compressed at the smaller end but never really pointed. The texture is fine—for Broadbills' eggs—with a smooth surface generally slightly and sometimes highly glossed, more especially in pure white eggs.

Two hundred eggs average 27.4×19.4 mm. : maxima 29.6×19.5 and 29.2×20.5 mm. ; minima 25.0×18.8 and 27.0×17.0 mm.

Both birds incubate and both share in nest-building. They take a very long time to build the nest and I have seen one half built and returned a fortnight later in time to see the final decorations added. I think as long as three weeks are often taken in its construction, sometimes even more. I cannot say how long the eggs take to incubate, but it is over fourteen days, as a clutch of five complete on the 1st June had not hatched on the 14th of that month, none of the eggs being chipped.

Calypdomena viridis Raffles.

THE GREEN BROADBILL.

(1336) *Calypdomena viridis* *continentis* Rob. & Kloss.

THE MALAY GREEN BROADBILL.

Calypdomena viridis, Fauna B. I., Birds, 2nd ed. vol. iii, p. 475.

Calypdomena viridis *continentis* Rob. & Kloss, Jour. Fed. Malay States Mus. vol. xi, p. 54, 1926 (Isthmus of Kra).

Robinson ('Birds of the Malay Peninsula,' vol. i, p. 161, 1927) gives the range of this form as "South to Selangor and Penang Island; North to Amherst in Tenasserim" *.

Darling, and later Hopwood and Mackenzie, found this bird frequenting dense evergreen-forest, but Robinson and Siemund found one nest in Bandon, and the former says that the bird is "common in secondary and old jungle up to about 3,000 feet."

Hume's description of Darling's nest covers well those taken by Robinson, Hopwood and Mackenzie. He writes:—"They are invariably suspended from small twigs, generally across them and not from the extreme tip, and are egg-shaped except at the top, where they are pinched out flat along the twig, and from them depends a long tail, in some specimens fully three feet in length. The body of the nest is only about 9 inches in length and 4 in diameter ;

* The division of this species into races is very doubtfully correct; overlapping is very great and, when writing the 'Fauna,' I found myself quite unable to discriminate between them.

the entrance is large and oval, towards the upper part of the nest, from 3 to 3½ inches in height, and 2 to 2½ in width. The cavity is perfectly egg-shaped, and is from 5½ to 6½ inches in height and 3 to 3½ in diameter. Exteriorly the nest, which is very closely put together and much more compressed and compact than that of *Psarisomus dalhousiae*, is sometimes composed entirely of fine grass, and it is in these nests in which the tail, also composed of the same fine grass, is most developed. In others less of this grass is used and a good deal of moss is incorporated in the outer structure. In others again quantities of fine hair-like black roots and moss form the chief constituents of the exterior of the nests, though in these, too, a good deal of fine grass and other vegetable fibre is intermixed, and in these nests the tail is less developed, being here only 8 or 10 inches in length. Inside this exterior coating the nest is composed of broad flags, bamboo-spathes and the like, and inside this, at the bottom of the cavity, is a lining of soft grass."

Hopwood found one nest with no tail at all and another lined with green leaves over the grass."

The breeding season in Tenasserim is March and April.

Two or three eggs are laid which are a uniform spotless cream or creamy-yellow. In shape they are, as Hume says, graceful elongated ovals, rather pointed towards the smaller end.

Eleven eggs, including Hume's, average 29.7×20.7 mm.: maxima 30.6×21.3 and 30.1×22.0 mm.; minima 28.4×19.7 mm. (Hume's eggs).

Order II. CORACIIFORMES.

Suborder PICI.

Family PICIDÆ

(WOODPECKERS).

Subfamily PICINÆ

(TRUE WOODPECKERS).

As is well known, the great majority of true Woodpeckers breed in holes in trees, cutting these out for themselves and laying their eggs at the bottom of the holes with no attempt at a nest of any sort. The eggs are invariably white, unless stained, and are generally of a very glossy hard china-white. Unless, therefore, nests and eggs show some unusual character but little space will be given in the following pages to their details.

Picus squamatus.

THE SCALY-BELLIED GREEN WOODPECKER.

(1337) *Picus squamatus squamatus* Vigors.

THE HIMALAYAN SCALY-BELLIED GREEN WOODPECKER.

Picus squamatus squamatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 7.

This Green Woodpecker is common throughout the Western Himalayas from Gilgit, Afghanistan and Baluchistan to Sikkim at heights between 3,000 and 6,000 feet, and in some parts, as in the Simla States, to 7,500 feet and over.

This Woodpecker haunts forest of all and every kind, or open country which is well wooded or which has big avenues and orchards. It makes its nest-hole usually in a large tree and preferably in the trunk rather than in the branches or main limbs. Sometimes it digs out the egg-chamber as well as the tunnel to it, but more often it selects a tree which is partially rotten inside. It drills a horizontal hole, which may be 2 to 6 inches in length and then turns downwards at right angles into the rotten heart, in which it clears out a chamber of considerable size.

Most egg-tunnels are bored in trees at heights between 6 and 20 feet, but I have heard of others at 40 feet, and Marshall (C. H. T.) says that in Murree the nests are always 40 or 50 feet above the ground; at the same time it was in Murree that Rattray took one not 4 feet from it. The entrance is roughly about $2\frac{1}{2}$ inches across, and the tunnel may be anything from 6 to 12 inches long. If the egg-chamber has to be cut out of the solid tree it measures about 6 inches deep by about 5 broad. If, however, it opens into a natural hollow this may be of any size.

The breeding season is from about the middle of April to the end of June. Hume gives the breeding season as March to May, and says that the great majority of birds lay in April. Most of my correspondents, however, give May as the chief month for eggs.

The normal clutch of eggs is six, but four or five only are sometimes incubated. In appearance they are quite typical and in shape are generally rather broad ovals, decidedly pointed at the smaller end.

Fifty eggs average 31.0×22.6 mm.: maxima 32.5×22.8 and 31.3×24.0 mm.; minima 28.3×22.2 and 30.3×21.3 mm.

There is nothing on record as to incubation or as to which sexes bore out the nesting-holes.

(1338) *Picus squamatus zarudnoi* Menzbier.

THE AFGHAN SCALY-BELLIED GREEN WOODPECKER.

Picus squamatus flavirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 8.

Picus squamatus zarudnoi, *ibid.* vol. viii, p. 669.

This pale form of *squamatus* is found in Afghanistan and Baluchistan.

It is common on the hills above Quetta but its eggs have never been taken, though it certainly breeds there and the nesting-tunnels have been seen.

Picus vittatus Vieill.

THE LITTLE SCALY-BELLIED WOODPECKER.

(1339) *Picus vittatus myrmecophaneus* Stresemann.

THE NEPAL LITTLE SCALY-BELLIED WOODPECKER.

Picus vittatus myrmecophaneus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 10; *ibid.* vol. viii, p. 669.

This Woodpecker has a very wide breeding distribution, being found over the whole of India South of Bombay on the West and from that Presidency on the East, North through the Central and United Provinces to Nepal and again farther East to the Chin Hills in Burma. It is also found in Ceylon.

This Woodpecker frequents any kind of forest and equally often quite open country, if there are trees in which to breed. It is a bird of hills and plains alike, ascending to about 5,000 feet in the Himalayas, though it is more common below 3,000 feet.

They bore their nest-holes as a rule low down in either the branches or trunks of trees, generally between 10 and 20 feet from the ground. The horizontal tunnel measures about 2 inches in diameter and may be anything up to a couple of feet in length, while the chamber may measure about 5 by 4 inches, unless in a natural hollow, which may, of course, be of any size.

Over the whole of its range March and April seem to be the principal breeding months, but Terry found that in the Pami Hills eggs had not been laid in a nest-hole he examined in May, and Hume also says that in the Nilghiris it breeds well on into May.

The full clutch seems to number three to five, and in shape the eggs vary from moderate to very broad ovals, not much compressed at the smaller end.

Thirty eggs average 26.2×20.1 mm.: maxima 28.0×22.0 and 27.3×23.0 mm.; minima 24.1×18.5 mm. I should expect a larger series to give much smaller measurements, as in my small series there are two clutches of almost abnormally large eggs.

(1340) *Picus vittatus dehræ* Stuart Baker.

THE HIMALAYAN SCALY-BELLIED WOODPECKER.

Picus vittatus dehræ, Fauna B. I., Birds, 2nd ed. vol. iv, p. 11.

This race of *vittatus* inhabits the Western Himalayas from Kumaon to Garhwal and Western Nepal.

The only note on the breeding of this bird in Hume's 'Nests and Eggs' is to the effect that in "the Doon and Kumaon Bhabur" the birds lay from March to May. In Kashmir it breeds in May and June and in Garhwal during the same months. It seems to breed in any kind of tree and at any height from the ground between 6 and 40 feet while, more often than not, the tree selected seems to be one in the open or in an orchard. Ward has taken its eggs from trees at about 7,000 feet elevation, and it also breeds as low down as 2,500 feet.

The few eggs I have measure about 27.4×20.8 mm.

(1341) *Picus vittatus viridanus* Blyth.

THE BURMESE SCALY-BELLIED WOODPECKER.

Picus vittatus viridanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 12.

The present form is to be found over practically the whole of Burma except the Chin Hills on the North-West and Eastern Karenni, near Siam.

The only eggs I have were taken by Hopwood from February to April at Tharrawaddy and, on the 28th February, at Sinlum Kaba. Three nests contained three, one and two eggs, all decidedly incubated. A note with the eggs merely says that "they breed in just the same kind of situation as *Gecinus occipitalis*."

Ten eggs average 28.3×21.4 mm.: maxima 28.9×21.7 mm.; minima 27.9×20.9 mm.

(1342) *Picus vittatus eisenhoferi* Gyldenstolpe.

THE SIAM SCALY-BELLIED WOODPECKER.

Picus vittatus eisenhoferi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 12.

This Siam race has been obtained within our limits at Karenni and may possibly be found over a considerable part of Eastern Burma. It extends through Siam, Annam and Cochin China.

The only recorded note on its breeding is that of Herbert (Jour. Siam Nat. Hist. Soc. vol. vi, p. 299, 1924):—"My experience of the breeding of this Woodpecker is confined to three nests found in the Bansakai fruit-gardens.

"On two occasions the nesting-hole was situated in a 'ton-lang' tree, and on a third it was in a durian tree, the height in all cases being about 20 feet from the ground. The eggs were all taken in the month of February, the first clutch of four, which was slightly incubated, being taken on 9. 2. 16 and the other two 22. 2. 20 and 27. 2. 20. In the case of the first clutch, the male was caught on the nest at 10 A.M. and the skin is in the British Museum.

"The eggs are elongate moderate ovals."

Two of the above clutches, now in my possession, I should call broad ovals.

Eight eggs average 27.3×20.6 mm.: maxima 28.9×21.0 mm.; minima 26.1×20.2 mm.

It is interesting to note that the male was caught on the nest, and in my own experience I have found that the males of most Woodpeckers do far more of the work of incubation than the females.

Picus canus Gmelin.

THE BLACK-NAPED GREEN WOODPECKER.

(1343) *Picus canus sanguiniceps* Stuart Baker.

THE INDIAN BLACK-NAPED GREEN WOODPECKER.

Picus canus barbatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 13.

Picus canus sanguiniceps, ibid. vol. viii, p. 669.

This Woodpecker extends over the North-Western Himalayas to the Simla States, Garhwal and, probably, Western Nepal.

It appears to be indifferent to what type of country is available for breeding purposes so long as it is well wooded, and it is found, between 4,000 and 8,000 feet, equally in dense forest, deciduous forest, orchards and avenues in cultivated country and even in gardens. The tree selected for nesting purposes is nearly always one with unsound heart either in branch or trunk. The birds bore a short tunnel through the sound wood and then cut out enough of the dead wood inside to make a chamber big enough to hold the eggs and young. Sometimes the entrance is cut straight into a natural hollow, which suffices instead of a made chamber. The entrance to the tunnel may be almost any height from the ground, but is usually between 5 and 25 feet. Jones found one entrance only 6 inches above the ground, the eggs lying on touchwood in a natural hollow well below the level of the ground.

The breeding season is May and June and the birds are not double-brooded. Four to six eggs are laid, five being the most common number.

Twenty-eight eggs average 29.5×22.8 mm.: maxima 31.5×23.2 mm.; minima 26.9×22.8 and 29.2×21.4 mm.

(1344) *Picus canus gyldenstolpei* Stuart Baker.

THE ASSAM BLACK-NAPED GREEN WOODPECKER.

Picus canus gyldenstolpei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 15.

The Assam race of this Woodpecker extends West to Eastern Nepal and East to Manipur, the Lushai Hills and the districts of Bengal East of the Bay of Bengal.

This is an exceptionally common bird in Assam at all elevations from the plains up to about 5,000 feet, occasionally somewhat higher as a breeding bird and, exceptionally, up to 7,000 feet. I have found them equally common in the densest evergreen-forest and in the open park-like lands in the North Cachar Hills, as also in gardens, tea estates and similar country. They make their nest-holes in any kind of tree, but nearly always bore them in the trunks or one of the main limbs, and this at no great height from the ground. They prefer trees which are rotten at the centre, so that once the tunnel-entrance into the soft core is completed the work of making the egg-chamber is very quick and easy. I have found the chambers sometimes cut out of sound timber, and in these instances they measure about 6 inches deep by about 4 to 6 wide; when made in rotten timber they are much larger. This is the only Woodpecker with which I am well acquainted which sometimes makes use of a natural entrance to a natural hollow, though such of these that I have seen have all been small and have had to be enlarged by the birds.

Most nest-holes are very low down, few being out of reach of one's hands, while occasionally they are placed actually among the roots of a tree, and many are only 2 or 3 feet above them.

The breeding season is April and May, though many birds commence laying in March, and I once found young birds hatched on the 23rd of that month.

The normal full clutch is four or five only, and I do not remember ever seeing six eggs or young.

Forty eggs average 28.9×22.0 mm. : maxima 32.0×22.0 and 29.0×23.5 mm. ; minima 26.0×21.0 and 28.0×20.4 mm.

The male bird does far more incubation work than the female, and when we trapped birds on their eggs, in three cases out of four it was the male which was caught. So too I think he does more of the work of cutting out the nest-hole and tunnel than does the female, though the two birds may be seen each working for a few minutes at a time and then being relieved by the other. They work mornings and evenings and very often at odd hours during the day, and the reverberations of the tapping for excavation work are faster, duller and more continuous than those made in feeding, and I found several nests by following up the noise so made.

The time of incubation is fifteen or sixteen days and the young birds leave the nest in about twenty-one days after hatching.

A curious habit of this and many other Woodpeckers is that of boring a new entrance even if the same nesting-hole is used again the following year. I have more than once seen three entrances all leading to the same hollow.

(1345) *Picus canus hessei* Gyldenstolpe.

THE BURMESE BLACK-NAPED GREEN WOODPECKER.

Picus canus hessei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 16.

This race occurs over the whole of Burma from the Chin Hills, Upper Chindwin and Shan States to Tenasserim. It is also found in Siam and Annam. I cannot separate the bird from South Peninsular Siam and Tenasserim, but Robinson and Kloss do this on account of its supposed smaller bill.

In the country it haunts and in its habit of nidification it does not differ from the other races. Oates found it commonly breeding in Pegu in May and June, while Bingham took a clutch of eggs on 28th April in Tenasserim. Hopwood and Mackenzie found many nests with eggs in the Chin Hills, Upper and Lower Chindwin, in April and May, while Cock found it breeding in the Shan States in April.

The number of eggs laid varies from three to five, and thirty-four average 29.6×21.6 mm. : maxima 30.2×22.2 and 30.2×24.3 mm. ; minima 26.0×22.1 and 26.9×20.0 mm.

Like all Woodpeckers' eggs, these often become very stained when the touchwood on which they lie becomes damp, and I have seen clutches a deep yellow-brown in colour.

Picus chlorolophus.**THE SMALL YELLOW-NAPED WOODPECKER.**(1346) **Picus chlorolophus chlorolophus** Vieill.**THE EASTERN HIMALAYAN SMALL YELLOW-NAPED WOODPECKER.***Picus chlorolophus chlorolophus*, Fauna B. I., Birds, 2nd ed. vol. iv., p. 17.

This Woodpecker ranges from Sikkim on the West to the Northern Shan States and Yunnan in the East, while in elevation it occurs from the foot-hills up to 2,000 feet commonly and, less often, up to at least 4,000 feet.

It frequents forest, both evergreen and deciduous, but is especially partial to bamboo-jungle and secondary growth or the outskirts of thin evergreen-forest. It also often breeds in trees standing in "jhum" or clearings cut in the forests for rice-cultivation. The jungle, including all small trees, is cut down and burnt, while the bigger trees are merely ringed and left to die. Such trees make a splendid breeding place for all birds which make holes in trees in which to deposit their eggs. This particular Woodpecker seems indifferent as to whether the tunnel is bored into the main trunk of a tree, the bigger boughs, or comparatively small branches at great heights. Most nest-holes are, I think, quite low down, and I have seen many at 2 or 3 feet from the ground. On the other hand, I have seen some at 40 feet and once saw the birds going in and out of a nest-hole cut in a small dead branch of a mighty Bombax which was certainly 60 feet from the ground.

The entrance to the egg-chamber is about 2 inches in diameter, anything from 2 to 4 inches in horizontal length, and then turns down to the rotten wood inside, from which a chamber is cut about 5 by 4 inches. Many Woodpeckers are indifferent to the state in which the dead wood is and, when wet, the eggs get deeply stained; but this little bird never, so far as I know, lays its eggs on anything but perfectly dry chips.

The breeding season is April and early May, but I have seen young the first week in April and have taken fresh eggs as late as the 3rd June.

The number of eggs laid is three to five and in shape they are rather broad ovals, sometimes rather pointed at the smaller end.

Fifty eggs average 24.3×19.0 mm. : maxima 28.9×18.3 and 25.6×19.6 mm. ; minima 22.0×17.2 mm.

Both sexes incubate, the male more than the female, and both take turns in cutting out the egg-chamber and entrance thereto.

Incubation takes fifteen days, perhaps sometimes fourteen, and the young leave the nest in about three weeks.

(1347) *Picus chlorolophus simlae* Meinertz.

THE WESTERN HIMALAYAN SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus simlae, Fauna B. I., Birds, 2nd ed. vol. iv, p. 18.

This form of *chlorolophus*, rather doubtfully distinct from the preceding race, breeds in the Outer North-West Himalayas from Mussoorie and Murree to Garhwal, between 3,000 and 6,000 feet.

There is nothing on record about this bird's breeding, but Jones and Dodsworth obtained it in the Simla States up to 7,000 feet, though it is rare everywhere, and Mackinnon found one nest at 5,000 feet near Mussoorie. The only eggs I have seen were a clutch of four taken by Whympers near Naini Tal at 5,000 feet. These were taken from a hole cut in a "banj" tree standing on the outskirts of forest on a fairly steep hill-side.

The four eggs average 25.5×19.15 mm. and are all much the same in size.

(1348) *Picus chlorolophus chlorolophoides* Gylden.

THE BURMESE SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus chlorolophoides, Fauna B. I., Birds, 2nd ed. vol. iv, p. 19.

This Burmese Woodpecker, although not very well known, is common over the whole of Burma from the Chin Hills, Kachin Hills and South Shan States to Tenasserim and is also found in Siam.

It appears to be a wholly forest-breeding form, when better known, it may also be found to breed in other kinds of country.

The only eggs I know of are those taken by Hopwood and Mackenzie in the Upper Chindwin. Three clutches of four, four and three eggs were taken by them on the 3rd March and 9th and 16th April, all from nest-holes cut in small trees at an elevation of about 3,000 feet, and this Woodpecker apparently breeds, or at least has been seen in the breeding season, between the foot-hills and 5,000 feet in this part of Burma.

From the above it would seem that March and April are the usual breeding months.

Mackenzie gives the average of fifteen eggs, which includes those referred to above, as 24.3×18.0 mm. : maxima 25.5×19.0 mm.; minima 22.8×17.2 mm.

(1349) *Picus chlorolophus chlorigaster* Jerdon.

THE SOUTHERN INDIAN SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus chlorigaster, Fauna B. I., Birds, 2nd ed. vol. iv, p. 19.

The distribution of this bird covers the whole of Southern India from the South of Travancore, North to Khandesh and North

Kanara. On the East its range has, so far, not been well defined, and it would seem to be found only South of Madras.

It is a forest bird and does not occur in gardens and parks or in open cultivated country.

Davidson obtained eggs of this Woodpecker during April and May in Kanara and Khandesh, Stewart took several clutches around Aneichardi in Travancore in February, while Bourdillon took a fresh three-clutch in the same district on the 8th May. Stewart's earliest clutch was taken on the 3rd of February.

Two seems to be the normal number laid, three being quite exceptional. It is very noticeable that the Southern Woodpeckers lay very small clutches, following in this characteristic the great mass of Passerine and Pico-Passerine birds. On the other hand, unlike these, they are very seldom double brooded.

Twelve eggs average 25.8×18.8 mm. : maxima 27.1×18.4 and 26.1×19.3 mm. ; minima 24.8×18.3 and 25.8×17.8 mm.

(1350) *Picus chlorolophus wellsi* Meinertz.

THE CEYLON SMALL YELLOW-NAPED WOODPECKER.

Picus chlorolophus wellsi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 20.

Like the preceding race, this Woodpecker is a bird of forests or of neglected gardens with very thick cover, and is confined to Ceylon, and even on this island almost entirely to the Southern half.

The only person who has found its eggs is Phillips, who took "two eggs, quite fresh, from a hole cut out in a branch of a tree standing in a tea-garden quite close to the forest," at an elevation of 3,000 feet.

The eggs measure 27.0×18.0 and 26.2×17.3 mm.

In a letter to me Mr. Phillips remarks that the "bird is not rare but very little seen."

Picus erythropygius Elliot.

THE RED-RUMPED GREEN WOODPECKER.

(1352) *Picus erythropygius nigrigenis* Hume.

THE TENASSERIM RED-RUMPED GREEN WOODPECKER.

Picus erythropygius nigrigenis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 22.

This fine Woodpecker extends over the greater part of Eastern Burma from Karenni and Tounghoo to Tenasserim.

The only note on its breeding is that of Bingham, who writes:—"All through the Thoungyeen Valley it is fairly common but local.

"In the great laterite belt covered by Eng (*Dipterocarpus*) forest, I found it plentiful.

"On the 18th March I found a nest of this Woodpecker in a hole in Pynkado-tree (*Xylia dolabriformis*) on the bank of the Meplay-choung. I found the passage (about 10 inches in length by $1\frac{1}{2}$ inches

in diameter) go obliquely down and end in a slightly enlarged chamber, in which I found two white, rather long and glossy eggs, lying on chips of wood. They measure 1.18 by .85 and 1.19 by .83 inches."

The only other eggs known were taken by Mr. A. James, who sent me two with a male bird which he had taken when out after big game in Karenni, the bird being captured on the eggs. They measure 28.0×20.8 and 27.8×19.8 mm. and were found on the 7th February.

Chrysophlegma flavinucha.

THE LARGE YELLOW-NAPE D WOODPECKER.

(1353) **Chrysophlegma flavinucha flavinucha** Gould.

THE LARGE YELLOW-NAPE D WOODPECKER.

Chrysophlegma flavinucha flavinucha, Fauna B. I., Birds, 2nd ed. vol. iv, p. 23.

This very handsome Woodpecker ranges through the Outer Himalayas from Mussoorie on the West to the extreme East and South of Assam, whence it extends throughout Burma about as far South as Moulmein. It is also by no means rare in the Shan States, but farther East is replaced by another race.

Whymper found it breeding near Naini Tal at about 4,500 feet and a little higher, while in the Naga Hills it has been recorded as breeding (Tytler) as high as 6,000 feet. This, I think, must be exceptional, as in the adjoining Cachar Hills, as well as in Manipur, it seldom breeds over 4,000 feet and is much more numerous between 2,000 and 3,000 feet, occurring right down to the plains. I wrote (Ibis, 1896, p. 351):—"Most nests are found in trees standing in rather thin forest with a good deal of undergrowth and such forests, practically evergreen, which border most of the smaller streams, are their favourite haunts during the breeding season. Although it does not often excavate its nest-hole at any great height from the ground, it does not, on the other hand, ever make it very low down. The majority of nests will be found between 10 and 15 feet up, the rest between 6 and 20. Again, it shows a marked preference for boring into the trunks of trees rather than into the larger limbs and branches. The tunnels are seldom of any great depth, being often only a few inches long."

Since this was written I have seen many more nests, but have little to add. The entrance, which is between $2\frac{1}{2}$ and 3 inches wide, generally leads direct into the rotten heart of the tree where there is either already a natural hollow or touchwood which is easy to clear out. The entrance is frequently only 1 to 3 inches long.

The breeding season is principally March and April, but a few birds breed in May, and I have taken fresh eggs in the Khasia Hills as late as the 2nd June.

The normal clutch is three or four, but I have taken two eggs much incubated and have seen two young in a nest-hole, while I have also seen one or two clutches of five eggs.

Forty eggs average 28.8×22.2 mm.: maxima 31.8×24.0 and 29.0×24.4 mm.; minima 26.4×21.4 and 29.0×22.0 mm.

The breeding display of this Woodpecker is very interesting and, perhaps, rather unusual. Like others of the family, they probably pair for life, but when the breeding season approaches they get very restless—even for Woodpeckers—and continually chase one another with a little squeaking cry. Finally, clinging to some tree, the female crouches close to the bark, and then the male, alighting higher up on the trunk, approaches her backwards, his head thrown right over his rump with beak held up and crest widely expanded. After getting within a few inches of her he sidles across to the other side and repeats the performance, all the time the hen bird squeaking and shivering with excitement until, after a few repetitions of the male's display, the two meet.

The male does most of the diurnal incubation, both birds occupying the nest-chamber at night. He also does most of the work of excavation.

***Gecinulus grantia*.**

THE PALE-HEADED WOODPECKER.

(1356) ***Gecinulus grantia grantia* McClell.**

THE ASSAM PALE-HEADED WOODPECKER.

Gecinulus grantia grantia, Fauna B. I., Birds, 2nd ed. vol iv, p. 27.

This Pale-headed Woodpecker is found from Eastern Nepal to Assam North and South of the Brahmapootra, Bengal East of the Bay, Manipur, Lushai and Chin Hills.

During the breeding season the present bird seems to be seldom found in evergreen-forest, but haunts bamboo- and scrub-jungle and prefers to all other cover both dense and thin secondary growth, more especially that which has grown up in deserted cultivation and in which dead trees and tree-stumps stand here and there among the bushes and other jungle. In such places they may be found from the plains, up to about 3,000 feet or, occasionally, 1,000 feet higher.

For nesting purposes the Pale-headed Woodpecker selects a stump or tree-trunk in which the centre has completely rotted away, so that very little work is entailed in cutting out an entrance less than 2 inches across and seldom more than a few inches deep. The eggs are then laid in the natural chamber in the interior of the tree, which may be of any size or depth. Very rotten trees are sometimes chosen for nesting purposes and I have, more than once, been able to break away the wood round the tunnel with my fingers. This

is never made at any great height from the ground, and those I have personally seen have been within 5 and 20 feet from it, while one taken by Hopwood in the Chin Hills was within 3 feet.

The birds lay in April and May, less often in March, on the 21st of which month Hopwood obtained his nest. I have taken one nest on the 2nd July, but this was, I think, a second brood of a bird whose previous young had been taken by a snake or lizard. A pair, whose three eggs I took on the 14th April, laid three more by the 7th May in the same egg-chamber, but made a new entrance just below the old one. The birds return for several years in succession to the same tree for breeding purposes, for I have several times seen three entrances made to the same egg-chamber.

The full clutch seems to be almost invariably three.

Twenty-four eggs average 25.7×19.2 mm. : maxima 27.9×19.6 and 25.0×20.2 mm. ; minima 22.0×17.8 mm.

Hypopicus hyperythrus.

THE RUFOUS-BELLIED WOODPECKER.

(1358) **Hypopicus hyperythrus hyperythrus** * (Vigors).

THE EASTERN RUFOUS-BELLIED WOODPECKER.

Hypopicus hyperythrus hyperythrus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 30.

We found this to be a common Woodpecker in Assam, and it extends from there West to Sikkim and Nepal and East to the Shan States, where Hopwood says "this was one of the commonest Woodpeckers at Kalaw." It is a forest Woodpecker and keeps much to evergreen-forest often at great heights. In Assam it was common from about 2,500 feet up to the highest peaks, but in the Himalayas it is found up to 12,000 feet in Sikkim, and Macdonald came across it in stunted birch-forest, though not breeding, at 14,000 feet. On the other hand, he found it below Darjiling in May and June at about 7,000 feet.

Hopwood found a number of nesting-holes in Kalaw, though he was unfortunate in not being able to take many full clutches of eggs. All the nests he found were between 2 and 15 feet from the ground and were all built in rotten stumps of trees, an opening being cut into the hollow centre. Small trees were selected, in one instance a Pine not more than 3 inches in diameter. At Maymyo Cook took other nests in quite similar places.

A nest taken by myself in North Cachar was made in a hollow

* Kloss separated the Annam birds under the name of *Dryobates hyperythrus annamensis* (Bull. B. O. C. vol. xlv, p. 7, 1925), and says the birds from the Southern Shan States "begin to approximate, and one specimen of several from Manipur examined is very similar." Hopwood's birds from Kalaw seem to me, however, to be quite typical *hyperythrus*, and I retain them under this name.

tree but with hard sound sides. The bird had selected a spot about 15 feet from the ground, and here he had made a hole about 2 inches wide and 4 inches deep, leading into the hollow in which the eggs were deposited.

April and May seem to be the two months in which eggs are laid, but doubtless they sometimes breed in the end of March.

Fifteen eggs average 22.2×16.5 mm.; maxima 25×16.0 and 24.5×17.2 mm.; minima 20.0×16.9 and 21.5×16.0 .

Both birds incubate, the male more than the female, and Hopwood and I have both caught males on the nest.

(1350) *Hypopicus hyperythrus marshalli* Hartert.

THE WESTERN RUFOUS-BELLIED WOODPECKER.

Hypopicus hyperythrus marshalli, Fauna B. I., Birds, 2nd ed. vol. iv, p. 31.

The Western form of *hyperythrus* is found in Kashmir, Kuman, Garhwal to Western Tibet, breeding from about 5,000 to 10,000 feet in forest of various kinds. Most observers have recorded it as a rare bird, but Ticehurst says that it is common. Rattray, who took several nests, says that it is a bird seldom seen at Murree, though more common in the Galis, and Whympor also saw it but very seldom in Kuman.

Marshall (C. H. T.) found it breeding about Murree in the latter end of April. Of the nests he remarks: "They were as usual mere holes in trees with the eggs deposited on the bare wood." Rattray says that the birds select very dense patches of forest to breed in, so that their nests are hard to find. The nests taken by him at Danga Gali and one at Murree were in holes in dead trees, two 20 feet from the ground and one 40 feet. They were all made in trees with rotten centres into which the egg-chambers were bored.

His eggs were taken the first week in May.

The full clutch, so far as we know at present, seems to be four or five.

Thirteen eggs taken by Rattray average 24.3×18.2 mm.; maxima 25.1×19.7 and 25.0×20.0 mm.; minima 23.0×16.6 mm.

Dryobates himalayensis.

THE HIMALAYAN PIED WOODPECKER.

(1360) *Dryobates himalayensis himalayensis* Jard. & Selby.

THE WESTERN HIMALAYAN PIED WOODPECKER.

Dryobates himalayensis himalayensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 32.

This Woodpecker appears to be confined to the Outer Himalayas of Kuman, Simla States and Garhwal.

They breed between 5,000 and 9,000 feet and keep to dense forest, generally of Oak, or much mixed with Oak, during the breeding season, and both Jones and Dodsworth say that they generally choose Oak-trees (*Quercus dilatata*) in which to bore holes for the nesting-places. Three clutches of eggs were all taken from holes in live Oaks bored out by the birds themselves, including the egg-chambers.

The entrance is made in the trunk of the tree 6 to 14 feet from the ground, and this, with the chamber, is about 10 inches deep.

They were all taken between the 21st April and 5th May.

Another clutch taken by Osmaston at Chakrata, 9,000 feet, was also from an Oak (*Q. semicarpifolia*) in thick Oak-forest. This was a clutch of five and was in a hole only 4 feet from the ground. The date for this was 30th April.

Twenty-five eggs average 26.0×19.0 mm. : maxima 27.7×20.0 and 25.7×20.3 mm. ; minima 24.1×19.0 and 26.0×18.3 mm.

The eggs of both the races of this Woodpecker are rather broad oval in shape, the smaller ends often somewhat pointed.

(1361) *Dryobates himalayensis albescens* Stuart Baker.

THE KASHMIR PIED WOODPECKER.

Dryobates himalayensis albescens, Fauna B. I., Birds, 2nd ed. vol. iv, p. 34.

The Kashmir Pied Woodpecker takes the place of the last from Murree and Kashmir to Gilgit and North-East Afghanistan.

Like the preceding bird, this is one of dense forest, while its nidification differs in no way from that of the same bird. Buchanan and Wilson both found it common in the Murree Hills and in Changla and Danga Gali between 5,000 and 8,000 feet, while in Kashmir Ward found its nesting-place up to 9,000 feet near Gulmarg.

The breeding season lasts through April and May, and I have no record of eggs taken later except those recorded in Hume's 'Nests and Eggs.' Hume says that he has found eggs up to the end of June, and Marshall (C. H. T.) says he has taken them up to the middle of June. It should also be noted that both the Marshalls speak of the tunnels being made at all heights from the ground between 10 and 40 feet.

The full clutch of eggs, according to Hume, is four or five, but I have had several threes sent me partially incubated and I have never seen a five, though I know that number is sometimes laid.

Twenty-eight eggs average 26.2×19.0 mm. : maxima 28.1×19.8 and 25.5×20.0 mm. ; minima 25.0×18.0 mm.

This Woodpecker is said to cut out its nest-hole indifferently in hard or soft wood, and it therefore varies much in size, but Hume says that the chamber, presumably when self-hewn, is about 4 inches in diameter.

Dryobates cabanisi Malherbe.**THE RED-CROWNED PIED WOODPECKER.****(1362) Dryobates cabanisi stresemanni** Rensch.**THE YUNNAN RED-CROWNED PIED WOODPECKER.**

Dryobates cabanisi stresemanni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 34.

This Woodpecker, which might with some reason be considered a geographical race of *himalayensis*, is found in Assam South of the Brahmapootra, Manipur, Chin and Kachin Hills, Shan States and Yunnan to Western China.

Cook and Livesey are the only collectors who have taken its eggs. Cook took one set of eggs in the Kachin Hills between 8,000 and 9,000 feet on the 3rd April, and says that they were evidently breeding there in March also. Livesey found them "not uncommon" in the South Shan States at about 6,000 feet, where they were breeding in the open forest during April. Forrest, though he took no nests, found the birds common in Summer between 8,000 and 13,000 feet.

Cook took his one nest "in a hole in a small tree standing in forest about 8 feet from the ground," while Livesey found several nests also "in small trees in open forest, about 10 feet from the ground."

The average of twelve eggs is 27.6×19.6 mm.; maxima 28.8×18.7 and 27.0×20.6 mm.; minima 27.0×20.2 and 27.1×18.5 mm.

As both Cook and Livesey caught or saw males in the nest-holes, they evidently assist in incubation.

(1363) Dryobates scindeanus (Horsf. & Moore).**THE SIND PIED WOODPECKER.**

Dryobates scindeanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 35.

This small species of Pied Woodpecker ranges from Sind to Baluchistan and Afghanistan; the Western Punjab into North-East Persia.

Ticehurst (Ibis, 1923, p. 25) thus sums up notes sent him by T. R. Bell, together with his own observations, on the breeding of this Woodpecker:—"The Sind Pied Woodpecker is more or less common, though of course rare in the less wooded parts, but it occurs even in the Khirthai; it is particularly addicted to Tamarisk-jungle, and in some of these along the Indus it may be said to be numerous. It commences boring operations as early as the end of February; March, however, is the more usual month, and most lay towards the end of that month or early in April, though young are recorded on the 22nd March. Doig found a late nest with young

on the 24th June, but most have finished breeding by then, as birds shot towards the end of May testify. Mr. Bell has sent me details of about 20 nests he has examined, and these, with a few others, show that the tamarisk is the favourite tree, being selected fourteen times, four in the 'babool,' three in poplar, one in 'kandi,' and one in a *Salvadora persica*, in this case an old hole of *Brachypternus dilutus* being utilized; to these I can add mango, which near Karachi is often used, there being no tamarisk. The site varies from three to twelve feet up from the ground, and the tree is more often a green one than not; often the tree selected is on the edge of a clearing, or is sometimes an isolated one. The entrance-hole measures about 42 mm. across, inside diameter 107 mm., and depth 6 to 10 inches. Four is the largest clutch I have notes of. On three occasions when Mr. Bell caught the bird on the nest it was the male."

To the above one may add that Butler saw a pair of birds starting their nest-hole in January and that Doig found a nest only 4 feet from the ground.

The only eggs I have in my own collection were given me by Bell and were taken in the end of March "from holes in tamarisk-trees, standing in clearings."

From two to four eggs are laid, the former number being sometimes incubated.

Twelve eggs average 22.2×17.0 mm. : maxima 23.4×17.4 mm. ; minima 22.0×17.1 and 22.3×16.4 mm.

(1364) *Dryobates darjellensis* Blyth.

THE DARJEELING PIED WOODPECKER.

Dryobates darjellensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 36.

The Darjeeling Pied Woodpecker extends West to Nepal and East through the hill-country to the Shan States, Yunnan and Setchuan.

This Woodpecker is resident, certainly breeding, from 5,000 feet up to the highest hills in Assam and up to 8,000 or 9,000 feet in Burma and Yunnan. In Sikkim Stevens found it between 6,000 and 12,000 feet, and took several clutches of eggs at Maikola, in Nepal, between 8,000 and 10,000 feet.

They apparently only breed in very dense forest, generally selecting trees of no great size and boring their nest-holes in the main trunk between 6 and 10 feet from the ground. Masson sent me a clutch of four taken from a "nest-hole in deep forest, cut in a living tree at about ten feet from the ground. Entrance about 2 inches in diameter and about a foot long, the chamber being about 6 inches deep by 5 wide. Taken at 8,000 feet and the male caught on the nest."

Nests and eggs taken by Stevens were similar to the above.

The breeding season is April and May, principally the latter month, the clutch varying from two to four.

Twenty eggs, including all Stevens's, average 27.8×19.8 mm. Stevens has not given maxima and minima, but in the few I have the maxima are 29.0×19.7 and 26.9×19.9 mm.; minima 26.5×19.0 mm.

Dryobates cathpharius.

THE HIMALAYAN LESSER PIED WOODPECKER.

(1365) ***Dryobates cathpharius cathpharius* Blyth.**

THE HIMALAYAN LESSER PIED WOODPECKER.

Dryobates cathpharius cathpharius, Fauna B. I., Birds, 2nd ed. vol. iv, p. 37.
Dryobates cathpharius cathpharius, ibid. vol. viii, p. 670.

This Woodpecker is restricted to the Outer Himalayas from Nepal to Upper Assam at elevations between 4,000 and 8,000 feet and most often between 5,000 and 6,000.

It is a forest-bird, and the few nests taken have all been in trees standing in dense or very dense tree-jungle. Stevens does not appear to have taken the eggs, but Gammie found a nest below Darjeeling at 4,000 feet and Masson took two others near the same place at about 7,000 feet, catching one male on the nest. This he sent me, with the eggs. Gammie obtained the eggs in April, Masson in May, while Hodgson says that in Nepal the birds begin to lay in April and the young are ready to fly in July.

Twelve eggs average 23.3×16.8 mm.: maxima 25.0×17.4 and 24.4×17.7 mm.; minima 19.5×18.5 mm. (eggs taken by Gammie).

(1368) ***Dryobates macei* (Vieill.).**

THE FULVOUS-BREASTED PIED WOODPECKER.

Dryobates macei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 39.

In the West this little Woodpecker is found about Murree and Dodsworth obtained it low down, 3,500 feet, in the Patiala State. Thence it extends through Nepal and Sikkim to Bengal and to the Hills East of Assam, and it has also been found at Akyab.

Stevens thinks there may be two races of this bird, a larger one from the Sikkim Terai, and a smaller one from the Dibrugarh plains. Beyond the latter, however, we have in the Surma Valley birds which are as large as the Sikkim ones. I therefore retain all under the one name, *macei*.

This Woodpecker is not a forest-bird, but prefers open well-wooded country, clearings for cultivation in forest, thin deciduous tree-jungle or the fringes of the denser forest.

In Assam we found its nest in the plains, which in Lakhimpur are 700 to 1,000 feet above sea-level, and in the hills up to some 4,000 feet, though it was most common below 2,000 feet. On the other hand,

Marshall took two eggs from a nest-hole at 6,500 feet near Murree and Hutton three eggs at Mussoorie at 5,500 feet.

I have seen a fair number of nests—over a dozen—of this species, and nearly all these have been cut in small trees, in the trunk or branches indifferently, at anything between 3 and 10 feet from the ground, but most often about 4 or 5. Sometimes it is cut into rotten parts of trunks or branches but, as a rule, into quite sound wood. One nest-hole was made in a hard-wood post of a cattle-pound in Sadiya, a work entailing immense labour on the part of the little birds. The entrance was about $1\frac{1}{2}$ inches in diameter and penetrated 6 inches into the post, and then turned at right-angles for another 6 inches, terminating in a little chamber about 5 by 4 inches. This was typical in every way of the other nest-holes seen by me in trees.

The birds sit very close and, nearly always, when we caught or saw the bird it was the male, who, undoubtedly, does the greater part of the incubation.

The breeding season is late for a Woodpecker. Most birds breed in April and May, but the eggs taken in Sadiya were fresh on the 12th June, while Coltart took a clutch of three, very slightly incubated, on the 23rd July at Margherita.

I do not think they are double-brooded, these very late nests being probably due to the first eggs having been destroyed.

The full clutch is three to five eggs, generally three.

Twenty eggs average 22.2×16.4 mm. : maxima 23.3×16.6 and 23.0×17.2 mm. : minima 21.0×16.0 and 21.9×14.9 mm.

(1369) *Dryobates atratus* Blyth.

THE STRIPE-BREADED PIED WOODPECKER.

Dryobates atratus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 41.

I still consider that this little Woodpecker must be given full specific rank, as in the Khasia and Cachar Hills, and in Manipur, both this and *macul* are almost equally common, yet individuals are always easily referable to one or the other. The range appears to run from the districts of Assam named above to practically the whole of Burma as far South as Tenasserim.

Like the preceding species, this is found from the level of the plains up to about 5,000 feet, being most common between 2,000 and 4,000 feet. I have taken several clutches of eggs of this little Woodpecker and had others brought to me with one or both the parents. With one exception the eggs have been taken from nest-holes cut in trees standing in cultivated clearings surrounded by forest or jungle, while all have been low down, between 4 and 10 feet from the ground. The tree selected is generally a small dead one or merely a stump of one, but they are always fairly sound, and I have never known them bore into rotten wood. The one

exception to the above was a clutch I took from a stump standing on a bank in rather open Pine-forest. The bird flitted from the hole when I tapped the tree, and I thought it was *macei*, but when we set nooses and caught the male I at once saw it was not this bird but *atratus*.

The breeding season is from the end of March to the beginning of May. I have taken three clutches in June, one of three on the 24th of that month being obviously a second brood, so it is possible that this Woodpecker is sometimes double-brooded.

The full clutch of eggs is four or five, but an exceptionally large percentage of eggs are addled. I have seen nest-holes containing two young and three addled eggs or three young and two eggs.

Twenty-two eggs average 21.3×16.9 mm. : maxima 24.1×17.8 mm. ; minima 19.0×14.3 mm.

A curious habit of this little Woodpecker is that of both sexes sitting on the eggs at the same time. I have myself caught both male and female on the nest by just stuffing up the entrance with my handkerchief directly I spotted the entrance, one of my men doing the same thing twice in one week. The birds sit very close and will not leave until the tree is shaken or tapped.

(1370) *Dryobates brunneifrons* Gould.

THE BROWN-FRONTED PIED WOODPECKER.

Dryobates auriceps, Fauna B. I., Birds, 2nd ed. vol. iv, p. 42.

Dryobates brunneifrons, ibid. vol. viii, p. 671.

The range of this Woodpecker extends from the Afghan and Baluchistan boundaries, through Kashmir, to the Simla States, Garhwal and Nepal.

This is one of the most common Woodpeckers of North-West India between 2,000 and 6,000 feet, while it sometimes breeds as high as 7,500 feet, at which altitude Dodsworth and Jones obtained eggs. They breed both in forest and in open country, while Hutton obtained four eggs from a hole bored in a hard oak post of a gate to a field near his servants' quarters. Hume says they prefer Oak and Fir to other trees and other collectors have noted its preference for the first-named. In a letter to me Dodsworth writes :—"The Brown-fronted Woodpecker is quite common round about Simla and breeds up to practically 7,000 feet. It frequents and breeds in both pine forests, Deodar and mixed oak and other forest, but I think prefers oak, making its nest at any height from the ground. Sometimes, generally I think, it cuts out its own nest-hole, less often it employs a deserted nest of a Barbet or even a natural hollow. April is the usual breeding month." Hume says they make the nest-hole at any height from 6 to 40 feet from the ground ; Whymper found nests in Medlar and Bhary trees "under 10 feet from the ground," while Unwin took one at Agrore in a hole in a Fir-tree 9 feet from the ground.

Hutton records that "A Paroquet (*P. rosea*) made a hole in a tree but was shortly after driven out by a *P. brunnifrons* who, however, in three or four days also left it."

The breeding season is April and May.

The full clutch of eggs is four or five, fifty averaging 23.4×17.4 mm.; maxima 26.1×17.2 and 24.0×18.2 mm.; minima 20.0×15.3 mm.

Some eggs are decidedly long, but not pointed ovals.

Dryobates analis * (Bonaparte).

THE SPOTTED-BREASTED PIED WOODPECKER.

(1373) **Dryobates analis andamanensis** Blyth.

THE ANDAMAN SPOTTED-BREASTED PIED WOODPECKER.

Dryobates analis andamanensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 45.

This Woodpecker is confined to the Andamans, where Osmaston, Wickham and Anderson all found it breeding freely round about Port Blair, frequenting avenues, gardens and open country round the settlement. They bore their nest-holes both in the larger branches and the trunks of trees, generally between 5 and 15 feet from the ground. The favourite tree is undoubtedly the "Rain-tree" (*Pithecolobium saman*), which is largely used in the Andamans for the avenues. When made in branches Osmaston remarks that the entrance is usually on the underside of the branch where, of course, it is protected from rain.

The breeding season is January to March and the earliest and latest dates I have recorded are 18. 1. 07 (Wickham) and 30. 3. 07 (Anderson).

The full clutch of eggs is one to three.

Wickham, in *epistola*, writes to me :—"The *Dendrocopus* (= *D. a. andamanensis*) ben often lays only one egg; I have more than once taken a single egg hard set and I twice found nests with one young. Last year Osmaston also got a single egg hard set, though I was so fortunate as to get a clutch of three."

Thirty eggs average 21.2×16.3 mm.; maxima 22.4×15.9 and 21.6×16.8 mm.; minima 20.0×14.9 mm.

One egg taken by Osmaston is abnormally small, measuring only 18.1×13.3 mm.

All the eggs I have seen have been rather short, broad ovals, very little compressed at the smaller end.

* This name has been rejected because it was *wrongly* quoted as a synonym of *minor* by Bonaparte (Consp. Av. p. 137) together with *wagleri*. As a matter of fact Horsfield (Zool. Res. in Java, 1829, Ger. Cat. at end, ex Temm. MS.) gave *analis* as a new name for the bird which he had originally believed to be the same as *minor*. As he later found it was not the same he gave it the name *analis*, which must stand.

Leiopicus mahrattensis*.*THE YELLOW-FRONTED PIED WOODPECKER.**(1374) ***Leiopicus mahrattensis mahrattensis* * (Lath.).****THE SOUTHERN YELLOW-FRONTED PIED WOODPECKER.***Leiopicus mahrattensis mahrattensis*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 46.

Adhering to the distribution of this bird as given in the 'Fauna,' this Woodpecker is found in Ceylon and the whole of Southern India, on the West about as far North as Poona; the Deccan, Berar in Central India, Bustar and the Northern Circars, Orissa, Manbhum and Birbhum (Borabhum). It is not the form in the drier districts of Chota Nagpur, though these are further South.

This Yellow-fronted Woodpecker is not uncommon in many parts of South-West India, and all the notes in Hume's 'Nests and Eggs' refer to the Southern rather than to the Northern race. They breed from the plains up to at least 4,000 feet, as Aitken (B.) found them at this elevation near Poona in May. The birds frequent open country, roadsides, gardens and orchards, and Bourdillon says they are rare in Travancore, which is too heavily wooded for them. While they may at odd times be found breeding in almost any kind of tree, Babools and Acacias of no great size are those most often selected, the entrance-tunnel being cut either in the trunk or in the underside of a branch low down, between 5 and 20 feet from the ground. In Ceylon Wait notes that they generally choose Euphorbias in which to cut out their homes. Trees are generally selected which are decayed in the centre, though frequently the birds work out their nest-holes in quite sound wood.

The breeding season in Southern India is January to March, in which latter month Davison took many nests in Kanara. In Ceylon Wait says that most birds breed in May and July.

Two to four eggs are laid and twenty-four average 22.2×16.4 mm.; maxima 23.2×16.0 and 22.5×17.2 mm.; minima 19.2×15.0 mm.

(1375) ***Leiopicus mahrattensis blanfordi* Blyth.****THE NORTHERN YELLOW-FRONTED PIED WOODPECKER.***Leiopicus mahrattensis blanfordi*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 47.

The range of this subspecies is the whole of India North of the

* The fact of the type-locality of *aurocristatus* Tickell being "Borabhum," in South-West Bengal, does not, I think, enable us to resuscitate this name for the Northern race. Even if the types of *aurocristatus* are not absolutely typical of the Southern race, they are certainly nearer to an average Southern bird than to an average Northern one. We have, therefore, no alternative but to join them with the former and as, with the material available, the Northern bird cannot be separated from the Burmese one, it must bear the same name, *blanfordi*.

area occupied by the preceding bird; Bihar, Assam, Manipur, Lushai Hills and the whole of Burma, in the hills and adjacent plains, as far South as Tounghoo. East it is to be met with in the Shan States and Cochin China.

Nowhere does this bird ascend the hills to any height, but it has been recorded in the Western Himalayas up to 6,000 feet, which must be exceptional. In the East it occurs up to about 2,500, but it is really a plains bird, breeding in the hottest and driest parts of Northern India and the hottest and wettest parts of Bengal and Assam where, however, it is a very rare bird. In Burma I have never heard of it ascending the hills above 2,000 feet and Hopwood obtained it breeding in the plains of the Lower Chindwin.

It is, like the last, a bird of open country, gardens and cultivated tracts, but in Assam and Burma sometimes frequents thin forest or the outskirts of dense forest.

E. H. N. Gill (Journ. Bomb. Nat. Hist. Soc. vol. xxx, p. 274, 1925) writes about this bird's breeding:—"The nesting season is from the end of February to the beginning of May, and the eggs are deposited in holes in trees at varying heights from the ground. Sometimes the branches in which the holes are drilled are dry and decayed and sometimes quite green and robust; sometimes quite perpendicular and sometimes slanting. The aperture is circular and about an inch and a half in diameter. It goes straight into the branch for a couple of inches and then turns downwards to a depth of 6 to 8 inches, the egg-cavity at the bottom being hollowed out and lined with bits of wood and bark."

The few nests I have taken have been similar to the above, the chamber being about 4 to 5 inches deep and about 3 to 3½ wide. There is, of course, no lining, the chips on which the eggs lie being merely what have fallen to, or remained in, the bottom of the hole when drilled. I have taken one nest from a branch of a tree about 35 feet from the ground, but Rattray (Jhelum), Jesse (Lucknow), Jones (Meerut) and Hopwood (L. Chindwin) all report nests between 10 and 20 feet.

The breeding season everywhere is March and April and few eggs are laid in other months, though I once took three fresh eggs on the 18th August.

Twenty-five eggs average 21.3×15.4 mm.; maxima 24.2×16.0 and 21.2×17.4 mm.; minima 19.5×16.0 and 20.3×15.2 mm.

Gill says that "both birds assist in building the nest and in feeding the young, and it is quite common for the same nest to be used for several years in succession."

Yungipicus nanus Vigors.
THE PIGMY WOODPECKER.

(1376) **Yungipicus nanus semicoronatus** Malherbe.

THE DARJILING PIGMY WOODPECKER.

Yungipicus hardwickii semicoronatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 49.

Yungipicus nanus semicoronatus, ibid. vol. viii, p. 672.

This tiny Woodpecker extends throughout the Outer Himalayas from Sikkim to Eastern Assam, North of the Brahmapootra. In the Khasia Hills the birds are also of this race though a few approach *canicapillus*, while in the adjoining Cachar Hills all specimens are of this latter race.

The birds breed principally between 3,000 and 4,000 feet, but a good many as low as 2,000 feet and, possibly, some even lower than this. Coltart and I both found this Woodpecker common at Margherita at 1,000 feet but never succeeded in finding a nest.

Apparently no one has taken the nest of this Woodpecker except myself. In the Khasia Hills it was very common, breeding in thin forest or, more often, in open country, cultivation fields surrounded by forest, or in patches of Rhododendron, Oak or other forest of small extent and surrounded by grass-land. Most nest-holes are made in horizontal or slanting branches of trees at heights from the ground varying from 15 to 35 feet and nearly always over 20. The entrance is invariably cut on the underside of the branch and is from $1\frac{1}{2}$ to $1\frac{1}{4}$ inch wide; the tunnel runs in straight for 2 inches and then turns downwards for another 4 to 8 inches into a chamber which measures between 3 and 4 inches wide and 4 to 7 inches deep. The branch selected is seldom one of any size and is usually 6 inches or less in diameter; sometimes a rotten branch is employed but, as a rule, only sound branches are drilled into.

The breeding season is April and May, but I have taken or seen a good many eggs in June.

A full clutch numbers four or five eggs and thirty of these average 18.6×14.4 mm. : maxima 20.8×15.0 and 18.8×15.2 mm. ; minima 17.6×14.9 and 18.3×14.1 mm.

Both sexes assist in boring out the nest-hole, in incubation and in feeding the young, while, in all three duties, the male bird is the most strenuous and hard working.

Drilling the tunnel and chamber goes on mostly in the mornings and evenings and not for very long at a time, each bird hammering away for a few minutes and then being relieved by its mate. Making the nest-hole is a very long job as a rule, the birds often commencing in early March and not finishing until early April, nearly or quite a month.

How long incubation lasts is very difficult to determine but I have known young birds to be in the nest on the sixteenth day after the

last chips of wood had been thrown out. This would make the period to be twelve or thirteen days, which is probably correct.

They remain in the nest for nineteen to twenty-three days after hatching.

(1377) *Yungipicus nanus nanus* Vigors.

THE SIMLA PIGMY WOODPECKER.

Yungipicus hardwickii mitchellii, Fauna B. I., Birds, 2nd ed. vol. iv, p. 50.
Yungipicus nanus nanus, ibid. vol. viii, p. 672.

This little Woodpecker has been recorded from Kumaon, Garhwal and Nepal, and Mackinnon also found it breeding near Mussoorie.

All that is recorded of its nests and eggs is a note by R. Thompson that "it lays in April and May, in holes of trees, in the dense forest districts of the Bhabur and the lower Kumaon valleys. The young birds are able to fly in June; four or five in number usually to each old couple."

The only eggs I know of are three taken by P. Mackinnon below Mussoorie with no data.

These measure 20.0×15.7 , 20.8×15.3 and 19.5×15.8 mm.

(1379) *Yungipicus nanus canicapillus* (Blyth).

THE BURMESE PIGMY WOODPECKER.

Yungipicus hardwickii canicapillus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 51.
Yungipicus nanus canicapillus, ibid. vol. viii, p. 672.

The Burmese Pigmy Woodpecker is found over the whole of hill Burma from the North to Tenasserim. It is common in the hill tracts of Bengal North and East of the Bay of Bengal and in the Surma Valley and Manipur.

To describe the breeding habits of this bird is merely to repeat word for word what I have already said about the Darjiling race. The nesting arrangements, breeding season, number of eggs, incubation etc. are all exactly the same as for that bird. All I can say in addition is that I knew of one nest I watched for many days which was built over 40 feet from the ground on a great tree hanging over water, and that I have noticed that this little Woodpecker has a liking for the vicinity of water not shown by the Himalayan birds.

I have taken its nest from the plains up to about 4,000 feet, but very seldom over 2,500 feet.

(1381) *Yungipicus nanus brunneiceps* Stuart Baker.

THE NORTHERN INDIAN PIGMY WOODPECKER.

Yungipicus hardwickii brunneiceps, Fauna B. I., Birds, 2nd ed. vol. iv, p. 53.
Yungipicus nanus brunneiceps, ibid. vol. viii, p. 672.

This Pigmy Woodpecker occurs over the whole of Northern India north of a line drawn roughly from Khandesh in the West, through

Bellary in the centre, to the Nallamalai Hills in Madras. It is found in the foot-hills of the Kuman and Sikkim Terai, extending into Bihar and West and Northern Bengal.

This is an extremely common species in Bihar, in which province Inglis, Coltart, Harvey and others have taken or seen many nests. The nest-holes are nearly all made in branches of Mango-trees standing in the Mango-groves so numerous in the vicinity of almost every village in Bihar and Bengal. The nests may be almost any height from the ground between 5 and 45 feet, but the great majority are between 8 and 20. They are not easy to find, though the entrance is always on the underside of the branch but, once the birds are seen, they are easy to mark on to the nest as they are very tame confiding little birds. The entrance is tiny, sometimes a bare inch, and never so much as $1\frac{1}{2}$. The tunnel sometimes runs for as far as 8 inches to a foot before widening into a chamber about 4 inches in diameter. Coltart obtained many nests from the back of a horse which he had trained to stand still as he stood in the saddle and cut out the entrance.

Cock found nests at Seetapur in Mangos, as did Reed and Jesse also at Lucknow. Other nests have been taken in "Keekur"-trees (A. E. Jones) and Babool (Jesse).

As a rule the nest is cut in wood which is sound or only slightly decayed but, occasionally, it is drilled in quite rotten branches.

The breeding season is February, March and early April, and very few eggs are laid earlier or later.

The normal full clutch is three, sometimes only two, while I have seen none of four.

Twenty eggs average 17.9×13.7 mm. : maxima 19.2×14.0 and 18.5×14.1 mm. ; minima 17.0×13.4 and 18.0×13.2 mm.

In texture and gloss they are typical Woodpeckers' eggs, but in shape they are short, blunt ovals, as are all *Yungipicus* eggs.

Cock gives the following good advice :—" With rare Woodpeckers the egg-collector should always lift up the young, as an addled egg is often found with them in the nest."

(1382) *Yungipicus nanus gymnoptalmus* Blyth.

THE CEYLON PIGMY WOODPECKER.

Yungipicus hardwickii gymnoptalmus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 54.

Yungipicus nanus gymnoptalmus, ibid. vol. viii, p. 672.

Hume quotes Parker as writing :—" A nest of this Pigmy Woodpecker was in a hole 10 feet from the ground in a branch 3 inches thick. The entrance was circular and one inch in diameter. The cavity was excavated down the branch for 8 inches and was 2 inches by $2\frac{1}{4}$ wide. Two eggs were lying on the bare wood. A second nest contained three eggs."

These two nests were taken in February and July.

Legge ('Birds of Ceylon,' vol. ii, p. 127) says that "In the Western Province this Woodpecker breeds in February and March, nesting in holes in small branches." MacVicar found one nest containing three young in the Colombo District near Pore.

The eggs are said to measure about 15.8×13.5 mm. (In the 'Fauna' the measurements are misprinted 18.8 mm.)

Blythipicus pyrrhotis.

THE BAY WOODPECKER.

(1383) **Blythipicus pyrrhotis pyrrhotis** (Hodgs.).

THE RED-EARED BAY WOODPECKER.

Blythipicus pyrrhotis pyrrhotis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 55.

This fine Woodpecker is found from Nepal to Eastern Assam and Bengal; throughout Burma and South to Perak in the Malay States. The bird from Siam and Annam has been separated by Robinson and Kloss.

This is essentially a resident of very dense forest from the level of the plains, in which it very probably breeds, to the summit of the highest hills. In Sikkim it ascends certainly to 7,000 feet, and Stevens thinks still higher in the Mai Kola Valley in Nepal.

Its favourite resorts seem to be valleys and ravines, with streams, large or small, running through them, and with heavily forested banks, thick with undergrowth, dead trees etc. Here it drills its nest-hole in trees, living or dead, at heights between 3 and 10 feet from the ground. I have taken nests bored in quite sound wood, yet with tunnels $2\frac{1}{4}$ inches at the entrance, widening gradually to $2\frac{3}{4}$ inches, and fully 2 feet long, with a chamber at the end about 5 by 4 inches. Other nest-holes have been made in semi-decayed or quite rotten stumps, the entrance much shorter and the chamber a good deal bigger, while one nest was in a natural hollow, the entrance, also a natural one, simply rounded and enlarged by the birds.

Occasionally I have seen the holes drilled in tree-stumps in forest alongside roads. One such was beside the Gowhatty-Shillong road, where the bird had selected an old stump in a small spinney on the banks of a little hill-stream. Driving past this I noticed the bird fly out, and inspection showed two eggs slightly set, which I took. This was on the 13th May and, on returning on the 27th of the same month, I found that two more had been laid in the same hole.

The birds return year after year to the same tree, and I have seen one chamber with three entrances, the newest at the bottom and not more than 4 inches above the nest, the oldest at the top and about 18 inches above it.

They are late breeders for Woodpeckers, May and June being the months in which most eggs are laid, though I have seen one or two clutches in April.

As a rule three eggs are laid but, often, two only, while I have only one clutch of four in my series.

In shape the eggs are long ovals, generally decidedly pointed at the smaller end, occasionally rather obtuse.

Twenty-five eggs average 29.7×21.2 mm. : maxima 33.0×22.7 and 29.0×23.1 mm. ; minima 27.1×22.0 and 28.1×19.0 mm.

The male bird does most of the incubation and, at least, his fair share of the work of drilling the nest-hole.

(1384) *Blythipicus rubiginosus* (Swainson).

THE MALAY BAY WOODPECKER.

Blythipicus rubiginosus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 57.

This Woodpecker occurs in the South of Tenasserim from Mergui through the Malay States.

This bird has not yet been found breeding in Tenasserim, though it is resident wherever found and must do so.

Kellow obtained two clutches of eggs from holes which were both drilled low down in the trunks of small trees on the outskirts of forest.

Of these one was an addled egg found with two young ones on the 4th February, the other was a single incubated egg taken on the 17th of the same month.

The two eggs measure 32.0×24.0 and 31.9×22.1 mm.

They were taken in the plains but close to hills North-East of Perak.

Miglyptes tristis * Horsf.

THE FULVOUS-RUMPED WOODPECKER.

(1385) *Miglyptes tristis grammithorax* Malherbe.

THE BARRED FULVOUS-RUMPED WOODPECKER.

Miglyptes grammithorax, Fauna B. I., Birds, 2nd ed. vol. iv, p. 58.

Tenasserim is the only district in which this Woodpecker occurs within our limits, and from this it extends through the Malay States and Peninsular Siam to Sumatra and Borneo.

There is nothing on record about the breeding of this bird but,

* Our Fulvous-rumped Woodpecker appears to be merely a race of the Javan Woodpecker, *Miglyptes tristis*.

so far as we know at present, it is restricted to humid evergreen forest.

Major Moulton obtained two very hard-set eggs from a hole bored in a branch of a forest-tree on Mount Seramba, Borneo. The branch, about 4 inches in diameter, was a dead one but still fairly sound, and the entrance and tunnel combined was only about 3 inches long, while the chamber was about $3\frac{1}{2}$ inches deep and 3 wide, the entrances being about $1\frac{1}{4}$ inch. It was taken in March 1913.

One of these two eggs, now in my collection, measures 21.0×15.8 mm. and is stained a pale creamy yellow.

(1387) *Miglyptes jugularis* Blyth.

THE BLACK-AND-BUFF WOODPECKER.

Miglyptes jugularis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 60.

The Black-and-Buff Woodpecker occurs over the whole of Central and South Burma from Arakan and Karenni in the North to Tenasserim about as far South as Amherst. East it extends into Siam, Annam, and Cochin China.

Both Mackenzie and Hopwood found this quite a common bird in the heavily-forested areas in Tenasserim, but the former never came across a nest while the latter found one only. This was a small hole cut in a dead tree in thick jungle, containing one hard-set egg which measured 22.0×17.2 mm., and was taken on the 2nd March.

Micropternus brachyurus Vieill.

THE RUFOUS WOODPECKER.

Since I wrote the volume of the 'Fauna' containing the Woodpeckers the question of whether this group consists of one or more species and of how many races they should be divided into has been much discussed.

After further careful consideration I see no reason to divide *brachyurus* into two or more species. Links between each group are common in their intervening areas, showing that all have a common origin and are but geographical variations of the same thing, *i. e.*, one species with many subspecies. As regards subspecies, it is possible that I have not admitted a sufficient number. *Micropternus brachyurus squamigularis*, the Malayan race, may be admitted, and as *Picus gularis* of Jerdon is preoccupied by *Picus gularis* of Wagler, the name *Micropternus brachyurus gularis* will have to be changed to *Micropternus brachyurus jerdonii* of Malherbe (see 'Fauna,' vol. viii, p. 672). With these exceptions I retain my subspecies as originally proposed.

(1388) *Micropternus brachyurus williamsoni* * Kloss.

THE SIAM RUFOUS WOODPECKER.

Micropternus brachyurus williamsoni, Fauna B. L., Birds, 2nd ed. vol. iv, p. 62.

Omitting the area occupied by Sundevall's *squameigularis*, we may define the area of this form as from South of Pegu to the extreme South of Tenasserim and Siam from Bangkok, or Samkok to the South of Peninsular Siam. If, as some systematists still think, *williamsoni* of Kloss is the same as *squameigularis*, the former name will become a synonym of the latter.

The eggs of this Woodpecker have been taken only by Hopwood and Herbert, and the former's brief note, given me with eggs, agrees completely with the fuller account given by Herbert, except that the ants' nest from which they were taken was built on a bamboo. Herbert, when sending me two clutches of eggs, wrote as follows:—"I was fortunate in obtaining the nest of this most interesting bird on two occasions, and I think it was most probable that both nests belonged to the same pair of birds. My reasons for thinking this are that the second nest was taken a fortnight after the first from a place very near by and, considering that the Rufous Woodpecker had seldom been seen in the Bansakai gardens, which I was in the habit of visiting regularly, it would have been a curious coincidence for one pair to follow another in such quick succession.

"The first was discovered on a mango sapling, at a height of about 10 feet from the ground. The collector noticed the circular hole in the ants' nest when he was going his rounds, and shook the sapling, which frightened the bird from the nest. He probably shook it rather violently, as the stem was not thicker than his wrist, and gave the bird a bad fright, for it deserted the nest. I visited the place later in the day and, as the bird had not returned, I took the three eggs, which I found to be in an early stage of incubation.

"The second was in a similar ants' nest on one of the shade trees for the Betel-vines, at about the same height from the ground and some 200 yards away from the other sapling. In this case the bird was successfully snared as it left the nest, being taken by means of a noose tied to the end of a fishing-rod. The snare was suspended in front of the entrance and then a kick on the tree accomplished the desired result. The bird, a male, was caught about an hour before sunset, and the skin is now in the British Museum.

* I at first considered this to be a synonym of *burmanicus* Hume (Proc. As. Soc. Beng. 1870, p. 70), but on re-examination of the fine material in the British Museum I came to the conclusion that *burmanicus* was, on the whole, much nearer *phaeocephus*, the Northern form. Nor was I able to define any area in which *burmanicus* could be considered a stable form, as over all Pegu the birds vary so greatly individually that it is impossible to refer them to any definite race.



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"The nest was made by excavating a cavity in the globular-shaped nest of the tree-ant. These ants' nests are built round a fork on the stem of a sapling, and measure 10 inches to a foot in diameter. The material is exceedingly hard and so stands up to the work of the Woodpecker without cracking or breaking away too freely, and in both cases the bird made use of the fork of the tree for the entrance. The nests were partially occupied by the ants whilst the birds were sitting and remains of the ants were found in the stomach of the bird which was caught, while many heads were still attached to the tail-feathers. It will be seen therefore that this Woodpecker attacks a 'live' ants' nest in its most perfect condition, just in the same way as *Sauropatis* does with the nest of the large black ant.

"The eggs are slightly elongated ovals, fine in texture but with a mat surface, and in that respect unlike any other Woodpecker's eggs that I have seen. The shell is very hard. It is translucent, and not only are the contents visible, but if water is injected into the empty shell the amount can clearly be seen.

"Three eggs were found in each of the above nests."

Hopwood's and Herbert's eggs, now all in my collection, are alike in character, and are really very extraordinary. Herbert's description is excellent and applies to almost all eggs of Woodpeckers which are deposited in holes made in ants' nests. I say *almost* all because in very rare cases one comes on eggs which are not quite so transparent, though equally strong and thin-shelled. It cannot be the action of formic acid on the shells after deposition that causes this curious condition, for eggs laid a few minutes and others incubated several days have the same texture. The birds themselves, however, live very largely on these and other ants, and their diet may quite possibly have some effect on the eggs they lay. Another curious point is this: if we placed eggs other than those of the Woodpecker among a similar assembly of ants, they would in very quick time work their way into the eggs and extract every atom of their contents. Yet they seem never to attack the eggs or young of this Woodpecker, nor, I believe, do the Woodpeckers regularly eat the ants belonging to the nest in which they are breeding. If they did it would not take many days, or even hours, for two Woodpeckers to clear out a whole nest of its living ants, the pupae soon following the ants. I have found ants' nests in which young Woodpeckers have been reared to maturity and, when they have finally left, the nest is still as full of ants as when the entrance to the nest-hole was commenced. It is true that occasionally the birds have been found sitting on eggs or young in deserted, or partially occupied, ants' nests, but such cases are exceptional and possibly due to a mistake on the part of the bird. It must be remembered that if all these curious papier-maché black nests of the ants were examined whenever seen probably about two out of

three would be found to be deserted by the ants, yet not one Woodpecker's nest-hole in ten is to be found drilled in such nests.

These points, though raised here, refer equally to all those Woodpeckers who make their nest-holes in ants' nests, and need not be alluded to again. I have personally seen many hundreds of the ants' nests, which are, so I am told, made by *Crematogaster* ants of various species. They look like large cellular balls of black papier-maché and measure anything from 8 inches to 2 feet in diameter, and are built in trees and bamboos at any height from the ground between 7 and 70 feet, but most often between 10 and 30 feet. The ants are exceptionally vicious and, when taking eggs, unless the nests are first smoked, one gets badly bitten, the hands often swelling considerably and remaining so for some days. The whole affair seems to be on a par with the cases we know of in which the Laggar Falcon, though living mainly on Doves, yet never molests the same birds when breeding within a few yards of him.

The breeding season is probably January to March, Horbert having taken two clutches, one in January and one in February, while Hopwood took one in March.

The number of eggs laid seems to be three normally, two occasionally.

Eleven eggs average 27.1×19.5 mm.: maxima 29.8×20.8 and 28.0×21.0 mm.; minima 25.6×19.5 and 27.0×18.7 mm.

(1389) *Micropternus brachyurus phaiiceps* Blyth.

THE NORTHERN RUFIOUS WOODPECKER.

Micropternus brachyurus phaiiceps, Fauna B. I., Birds, 2nd ed. vol. iv, p. 63.

This race of Rufous Woodpecker occurs in the Himalayas from Nepal Eastwards to Assam and Northern and Central Burma; it is the form which is found throughout the Shan States and Northern Siam, but in South Central Burma, Pegu etc. it is difficult to say what race occurs. Many birds are as big as the biggest of the Northern race, others as small as the Southern. As I can define no definite area for their intermediate forms and give no distinguishing characters I leave them unnamed. If they were given a name it would be *burmanicus* of Hume.

As with the other races of Rufous Woodpecker, the favourite kind of country for this bird to breed in is thin deciduous forest or quite open country, well wooded and well watered. They also frequent secondary growth, bamboo-jungle or scattered scrub and small tree-jungle. The ants' nests selected by the birds for breeding in are often most conspicuous and can be seen from far away. Practically all the ants' nests, a great many, Coltart and I examined were live nests, but Gammie, who found four nests at about 2,000 feet in Sikkim, says that three of these appeared to be recently deserted.

It should be noticed also that while those we found in trees were nearly always in upright branches between 20 and 30 feet from the ground, Gammie's nests were at the ends of hanging branches within 6 to 10 feet of it. The birds make their entrance-tunnel about the middle of one side of the nest, this being rather under 2 inches in diameter, the cavity being about 5 to 6 inches in both diameter and height.

The breeding season is April to June and the number of eggs laid nearly always three. I have one clutch stained a deep brown, but it is just as transparent as the clean ones. So transparent are the eggs that the yolk does not give a pink tinge to the whole egg but shows through as a yellow ball.

Fourteen eggs average 26.0×19.6 mm.: maxima 28.3×20.0 and 25.4×20.2 mm.; minima 24.9×18.6 mm.

(1391) *Micropternus brachyurus mesos* Kloss.

THE ORISSA RUFOUS WOODPECKER.

Micropternus brachyurus mesos, Fauna B. I., Birds, 2nd ed. vol. iv, p. 65.

This subspecies, which forms a link between the Southern Indian and the Northern and Eastern races, is restricted to Bengal, Bihar, Northern Orissa and Assam South of the Brahmapootra. I obtained numerous nests of this bird in North Cachar and the Khasia Hills, where it was very common both in thin deciduous forest, secondary growth and in the open park-like lands in the North of the first-named district.

The nests are as I have already fully described for other races.

The breeding season commences in April and I have taken eggs on the 4th of that month and up to the end of June. Occasionally they may lay in the end of March, as I saw birds apparently feeding young in the nest in the first week of April in an ants' nest in a position impossible to approach.

As usual with this species, three is the normal number of eggs in a clutch.

Twenty-two eggs average 27.2×20.1 mm.: maxima 28.3×20.1 and 28.0×21.0 mm.; minima 25.0×20.1 and 28.1×18.9 mm.

(1392) *Micropternus brachyurus jerdonii* Malherbe.

THE SOUTHERN RUFOUS WOODPECKER.

Micropternus brachyurus gularis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 65.

Micropternus brachyurus jerdonii, ibid. vol. viii, p. 673.

The Southern Rufous Woodpecker is found in Southern India South of a line drawn from South Orissa to the North of the Bombay City.

It seems to inhabit much the same kind of country as the other subspecies, but the only note on its nidification is that of Davidson, who writes (Journ. Bomb. Nat. Hist. Soc. vol. vi, p. 335, 1891):—"This is a common Woodpecker in Kanara. I think the birds continue to inhabit their old nests, as I have found them about a nest I have known for months and there were no signs of any intention to lay again. The birds make a small tunnel into one of the nests of the small tree-ant, and hollow out a largish chamber. I have always found the ants still there, and have been well stung on examining the nest-hole. I think the birds breed in the rains, but in the middle of March a villager brought me three Woodpecker eggs which I flung on the ground."

Later Davidson succeeded in getting eggs in February, March and April, and Stewart obtained them in the latter two months in Travancore.

The number of eggs in a clutch seems to be two or three, generally the former.

Ten eggs average 28.1×20.1 mm.; maxima 30.2×21.8 mm.; minima 24.8×17.8 mm.

Brachypternus benghalensis.

THE GOLDEN-BACKED WOODPECKER.

(1394) **Brachypternus benghalensis benghalensis** Linn.

THE NORTHERN GOLDEN-BACKED WOODPECKER.

Brachypternus benghalensis benghalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 67.

This beautiful Woodpecker is found over a very large extent of country stretching from the foot-hills of the Himalayas in Kumaon on the West to Assam and Manipur on the East; South to Khandesh in the Bombay Presidency, the Central Provinces and South Orissa. In Sind and the North-West Frontier it is replaced by *dilutus*, while Western Punjab birds are somewhat intermediate.

If we except the driest, almost treeless areas which occur in parts of the country otherwise inhabited by this Woodpecker, and also the deep humid woods of other districts, there are few places where this Woodpecker is not a common bird. It frequents gardens, avenues, orchards, the trees around and in villages and also all kinds of thin deciduous forest, bamboo-jungle and scrub, if the latter has a few trees for breeding purposes. In the Himalayas they ascend to 2,500 feet and, more rarely, up to about 3,500 feet. The birds seem to breed in almost any kind of tree and at almost any height from the ground, though they certainly prefer Mango-trees to any other, while, as a rule, they drill their nest-holes in trees at heights between 5 and 15 feet. On the other hand, Whymper took three eggs

in the Kuman Terai from a *Bombax*-tree "at a great height from the ground," while I myself have taken others 2 and 3 feet from it.

The nest-holes are generally cut into big branches or into a trunk of a tree which is partially decayed; the entrance is a big one for the size of the bird—Hume says from $2\frac{1}{2}$ to $3\frac{1}{4}$ inches in diameter—but most of those I have seen have been 3 inches or more, and I have seen them up to $4\frac{1}{2}$ inches. The tunnel may be anything from a few inches to 3 feet, according to the condition of the wood inside the tree selected but, if in sound wood, is seldom more than a few inches long. In the same way the cavity may vary from about 6 inches either way to a natural hollow of almost any size. I have never seen a natural entrance used by this Woodpecker, but Hume says that "sometimes a natural hollow is used and only rounded off internally."

In the hills the laying season seems to be well defined and restricted to a period from the last week in April to the last week in June. In the plains, however, there are two definite seasons, the first from the end of February to April and again, after the rains break, in June and July.

All Hume's correspondents agreed in thinking three to be the full number of eggs in a normal clutch. At the same time, I have taken or received clutches of four or five eggs from Gunjong, Dacca and Nadia (myself); Bihar (Inglis, Coltart, Harvey); Lahore (Lindsey Smith); Lucknow (Jesse); Kuman Terai (Whymper) and so on.

Fifty eggs average 28.1×20.9 mm.; maxima 30.6×19.0 and 29.6×23.0 mm.; minima 26.0×20.6 and 27.5×18.9 mm.

Both sexes incubate and both take a share in the work of drilling the nest-hole.

(1395) *Brachypternus benghalensis puncticollis* Malherbe.

THE SOUTHERN GOLDEN-BACKED WOODPECKER.

Brachypternus benghalensis puncticollis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 69.

The range of this Woodpecker is South India, and the imaginary line from Khandesh to South Orissa, which forms the Southern limit of the preceding bird, may be taken as the Northern limit of the present one. It frequents the same kind of country as the typical race and has similar breeding habits, though but little has been recorded.

Davidson found it breeding in the Satpuras in March and obtained eggs on the 8th of that month, while Kinloch took a pair on the Nelliampathy Hills on the 7th February.

An egg taken by Davidson measures 27.4×19.3 mm. and two taken by Kinloch 34.7×22.0 and 33.9×21.7 mm., the latter being certainly unusually, if not abnormally, large.

(1396) *Brachypternus benghalensis dilutus* Blyth.

THE SIND GOLDEN-BACKED WOODPECKER.

Brachypternus benghalensis dilutus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 69.

This pale form is very common in Sind and extends all along the Frontier of North-West India. Ticehurst considers that the Punjab birds as far as Jhang and Ferozepore are of this race. To me it seems that birds of the Western and Central Punjab are all *benghalensis* or nearer *benghalensis* than *dilutus*, and the Chenab may be taken as the dividing line between the two.

There is nothing on record about the nidification. Rattray found it breeding in 1905 at Dehra Ghazi Khan in April, and Doig says that in Sind it lays its eggs during April. Ticehurst (Ibis, 1923, p. 20) writes that it frequents the vicinity of villages where the planting of trees has been encouraged, and along the roadside avenues in the vicinity of every town and big village "its works of carpentry is in evidence on all sides. But, perhaps, what is even more to its liking is really old, gnarled tamarisk-jungle, which trees in some places along the Indus attain a very large size and generally have plenty of decayed branches."

(1397) *Brachypternus benghalensis ceylonus* (Cuv.).

THE CEYLON GOLDEN-BACKED WOODPECKER.

Brachypternus benghalensis ceylonus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 70.

This Woodpecker, which is confined to Ceylon, is further restricted in its typical form to the dry Northern regions of the island. Central Ceylon and the wetter regions have birds, some individuals of which are nearer *ceylonus* with the golden back and others nearer *erithronotus* with the red back.

Phillips found these Woodpeckers breeding around the Tea-gardens in Anasigalla, taking a clutch of three slightly incubated eggs from a hole cut in a tree in some boundary jungle next the tea. A second single fresh egg was taken from a nest-hole cut in a Cocoa-nut-palm, on the 30th March.

These eggs measure 27.3×19.0 , 26.2×19.6 , 26.4×19.0 and 26.3×19.2 mm.

(1398) *Brachypternus benghalensis erithronotus* (Vieill.).

THE CEYLON RED-BACKED WOODPECKER.

Brachypternus benghalensis erithronotus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 71.

This Ceylon Woodpecker takes the place of the preceding bird in the Southern and wetter districts of the island.

It haunts forests more than the Northern form and seems to prefer thin strips of those between patches of cultivation and around Tea- and Rubber-estates. Jenkins first took its nest in a rice-clearing in forest near a Tea-garden, and later Stewart obtained two clutches of eggs from similar positions. Phillips found the bird common about the Mousakande Estate and took two clutches of eggs, one from a hole bored in a *Grevillea* tree-growing among the tea and one from a tree in a narrow strip of jungle next the tea.

There are two well-defined breeding seasons, the first in March and April and the second in August and September.

Two or three eggs are laid and, in some cases, the texture of those is not quite so hard and glossy as it is in most Woodpeckers' eggs, though they never approach the texture of the eggs of *Micropternus*.

Thirteen eggs, all I have seen, average 29.0×21.3 mm. : maxima 32.0×22.3 and 30.2×23.0 mm. ; minima 26.8×19.0 mm.

Dinopium* javanense.

THE GOLDEN-BACKED THREE-TOED WOODPECKER.

(1399) *Dinopium javanense intermedium* (Blyth).

THE BURMESE GOLDEN-BACKED THREE-TOED WOODPECKER.

Dinopicus javanensis intermedia, Fauna B. I., Birds, 2nd ed. vol. iv, p. 72.

This Woodpecker extends from Assam South of the Brahmapootra and Manipur, where it is very rare, to the whole of Burma North of, roughly speaking, 10° and East to Yunnan, Siam and Cochin China.

It is a bird of open country, so long as this is sufficiently wooded. They enter gardens freely and are common in thin scrub- and tree-jungle round villages, while they also frequent deciduous forest but never, I believe, really humid, evergreen forest. In Cachar it kept entirely to secondary growth, bamboo-jungle and clearances for cultivation.

Herbert found it breeding in Siam on the 14th June and notes :—
“The nest was in a living tree on the bank of the river at Ban-Khang, at only 3 feet from the ground and in such a position that it could be clearly seen from a launch when passing. The male was caught on the nest at three in the afternoon. The nest contained 3 eggs.”

Oates took a clutch, also of three eggs, from a hole which “appeared to have been a natural cavity, the entrance made large and circular.”

* In vol. viii, p. 673, it is explained how *Dinopicus* was used throughout vol. iv of the ‘Fauna’ by a printer’s error, due, I fear, to my extremely difficult handwriting.

Bingham, who says this is the most common Woodpecker in Tenasserim, obtained one nest 4 feet from the ground in a hole in a tree in some burnt Eng (*Dipterocarpus*) jungle. This, like the rest, contained three eggs on the 22nd March.

Finally Macdonald took from a hole in a tree in Tenasserim yet another clutch of three in early March.

From the above we gather that although the normal breeding season is March and April, some birds lay in June, while three eggs seem to form the full clutch.

In shape the eggs are rather longer than usual and sometimes well pointed.

Twelve eggs average 29.0×19.1 mm. : maxima 30.1×17.8 and 29.1×20.3 mm. ; minima 26.6×19.9 and 30.1×17.8 mm.

(1400) *Dinopium javanense rubropygialis* (Blyth).

THE MALABAR GOLDEN-BACKED THREE-TOED WOODPECKER.

Dinopicus javanensis rubropygialis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 73.

This, the Southern Indian representative of *Dinopium*, occurs in the South-West of India from Kanara to Travancore in the extreme South. It is found on the hills of Mysore and Western Madras and has been obtained further East in Madras.

Bourdillon and Stewart are the only collectors who have taken the eggs of this Woodpecker and their notes, sent me with a series of eggs, may be summed up as follows :—"Very common on the hills and plains at all elevations, but especially so between 2,000 and 3,000 feet, where its shrill melancholy cry can often be heard. It makes its nest in almost any kind of tree, but prefers Mangos, and at any height from the ground, occasionally as high as 30 feet, sometimes as low as 2 or 3, but generally between 5 and 15 feet. The full clutch of eggs is two or three, one as often as the other, and the breeding season is from early February to early April."

I have eggs in the series given me dating from 2nd February to 9th April.

Fifteen eggs average 29.4×20.4 mm. : maxima 31.0×23.0 mm. ; minima 27.3×18.0 mm.

(1401) *Dinopium shorii* (Vigors).

THE HIMALAYAN GOLDEN-BACKED THREE-TOED WOODPECKER.

Dinopicus shorii, Fauna B. I., Birds, 2nd ed. vol. iv, p. 74.

This Woodpecker ranges from Kaladoongi in the Doon to Assam, North-West Burma to Arakan and Pegu. Nowhere common, it is most often met with from the level of the plains up to 2,000 feet, and still more rarely up to 4,000 feet.

There is very little recorded about the habits of this bird and I have personally seen very little of it. Those I have seen have been either in rather thin deciduous forest or in park country, the trees nowhere close enough together to entitle it to be called forest.

One clutch of three eggs was brought to me with a female bird said to have been caught in the nest-hole. This had been drilled in the trunk of an Oak-tree standing in grass-land, about 4 feet from the ground, at an elevation of about 2,500 feet. Later I took a pair of eggs myself at Nangkrem in the Khasia Hills at an elevation of 6,000 feet, it being the only time I have seen the bird over 4,000 feet. This nest-hole, also, was made in a stunted Oak in grass-land at about 5 feet from the ground. The entrance and tunnel were about 6 inches long and the chamber about 5 by 5 inches. The male was caught on the nest. Finally Mackenzie obtained two other eggs from a tree on the Pasok Plateau, South Burma.

The bird is probably an early breeder, all three nests having been taken in the first half of April.

One nest contained three eggs, the others two each. The eggs of two clutches are very long ovals, of one (that taken by Mackenzie) short ovals.

Eight eggs average 29.9×20.8 mm.; maxima 32.1×21.6 and 32.0×22.4 mm.; minima 26.7×20.7 and 31.3×18.9 mm.

(1403) *Chrysocolaptes festivus* (Bodd.).

THE BLACK-BACKED WOODPECKER.

Chrysocolaptes festivus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 77.

There is nothing to add to the distribution of this bird as given in the 'Fauna.' "Ceylon; Travancore and Malabar, Bombay Presidency, Central India, North to Dehra Dun, the United Provinces, Chota Nagpore in Bengal and Bihar." There are specimens in the British Museum labelled "Sikkim" and "Assam," undoubtedly by mistake.

Davidson took eggs of this bird in Kanara from holes in trees in forest, nearly always a single egg. Howard Campbell took a single egg "from a nest-hole in a tree growing in a *shola* of mixed forest" in the Nilgiris, while Stewart took yet another single egg from a "tree in forest."

In Ceylon, however, Wait says that "they lay one to three eggs. The nest-holes are bored in large trees in jungle clearings and round villages; generally very high up. The same tree is used year after year, a fresh entrance being cut out each year. One egg measures $1.25 \times .88$ inch" ($= 31.7 \times 22.4$ mm.). He gives the breeding season for Ceylon as "March and again in August," but in India it appears to be December to early March.

Five eggs, all singletons, average 31.2×24.1 mm.; maxima 32.1×25.9 mm.; minima 29.9×24.2 and 31.7×22.4 mm.

Chrysocolaptes guttaeristatus.**THE LARGER GOLDEN-BACKED WOODPECKER.**(1404) **Chrysocolaptes guttaeristatus guttaeristatus** Tickell.**THE BENGAL LARGER GOLDEN-BACKED WOODPECKER.***Chrysocolaptes guttaeristatus guttaeristatus*, FAMA B. I., Birds, 2nd ed., vol. iv, p. 78.

This handsome Woodpecker is found throughout Bengal, Bihar and Assam. In Burma it occurs as far South as Rangoon and extends East into Siam, South to Bangkok.

This bird may be found from the plains up to about 5,000 feet in the hills South of the Brahmapootra, while it frequents practically every kind of country, from gardens, parks and the vicinity of towns and villages in Bengal to the densest, most humid and impenetrable forests of Assam. At the same time its preference is for open country—gardens, orchards and cultivated areas. In the plains its favourite tree is undoubtedly the Mango, but I have seen nesting-holes in Coconut-trees and many others; in the hills any tree seems to suffice. It generally selects such as are fairly sound on the outside but more or less rotten inside; in these, either in branch or trunk, it cuts an entrance, large for the size of the bird and often over 3 inches in diameter. The chamber, usually cut out of rotten wood, is also large, varying from 5×5 inches to 7×7, the height more often exceeding the width by a couple of inches. The distance from entrance to chamber is, in my own experience, sometimes only an inch or two and, sometimes, 2 to 3 feet. Occasionally the birds merely cut an entrance into some natural hollow, which may be of any size. Most nests are, I think, cut out at heights between 5 and 15 feet, but I have notes of entrances to nest-holes just above the ground and of one fully 40 feet above it.

The breeding season everywhere is March, April and May, a few birds laying in early June.

The normal clutch is four or five, while I have seen six eggs or young in a nest and have also found two eggs incubated.

Forty eggs average 30.0×22.1 mm.; maxima 33.1×23.3 and 31.6×24.0 mm.; minima 26.4×23.0 and 27.0×20.0 mm.

The cock bird does far more incubation than the female, and time and again I have caught him on the nest and only occasionally the female. So too, I think, he does more of the hard work of drilling the nest-hole, as I have noticed him drilling the entrance more often than the female and working at it for longer at a time. On the contrary, inside the tree the female appears to do more work in preparing the chamber.

The birds return to the same tree year after year. In North Cachar a pair of birds, presumably the same, bred in a ravine near my house.

for seven years in succession. For three continuous years they laid in a chamber in one tree, cutting fresh entrances each time; then for one year they built in a dead, very rotten stump standing close by. This fell down in a storm, and then for three more years they kept to a tree about 50 yards lower down the ravine. In this last year some vermin, a civet-cat I think, caught the cock-bird on the nest, ate both bird and eggs, and the hen, of course, cleared off. I do not know how many eggs were laid, but each year when the young first left the nest there seemed to be five with the parent birds, these being rapidly reduced to three or two before a couple of months had passed. The period of incubation is fourteen to fifteen days and the fledgling twenty-four to twenty-six days.

(1405) *Chrysocolaptes guttacristatus sultaneus* (Hodgs.).

THE HIMALAYAN LARGER GOLDEN-BACKED WOODPECKER.

Chrysocolaptes guttacristatus sultaneus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 80.

This race of the Golden-backed Woodpecker is resident in the Himalayan Terai from Kumaon to Sikkim between the foot-hills and 5,000 feet. In Sikkim it does not seem to ascend over 3,000, and Stevens says it is not common over 2,000 feet.

It frequents the same varied description of country as the preceding form, though I have very little information as to its breeding. Stevens says it does not breed over 2,000 feet in Sikkim, but in Naini Tal Whympers took two clutches of eggs, one from a nest-hole "high up in a Bombax-tree, another low down in a newly cut hole in a 'bang'-tree, both at about 4,000 feet elevation, the first containing three eggs, the second only two."

The five eggs taken by Whympers are all I have been able to measure. They average 32.1×22.0 mm. and in shape are long, pointed ovals.

(1406) *Chrysocolaptes guttacristatus delesserti* (Malh.).

THE SOUTHERN LARGER GOLDEN-BACKED WOODPECKER.

Chrysocolaptes guttacristatus delesserti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 80.

This Woodpecker has a curious distribution. It is found practically all over Southern India South of Bombay City and Orissa. In Burma it occurs throughout Peninsular Tenasserim and Siam. These latter birds have been separated by Hesse under the name *malayanicus* and by Kloss as *chersonesus*, but I have been unable to find any constant differences.

Davidson and Darling gave Hume notes on this Woodpecker which he summarizes as follows:—"The Southern Golden-backed Woodpecker breeds in the Nilghiris at elevations of from 5,500

to 7,000 feet. It lays in December, January and February in large holes, which it excavates for itself in trunks of trees at all heights from 6 to 60 feet above the ground.

"The bird lives all the year round in these holes, and when not disturbed lays year after year in the same hole.

"The nest-hole is about 3 inches in diameter at the entrance, runs in horizontally for a few inches, and then turns straight down for another few inches, and then widens out into a chamber some 6 inches in diameter.

"Neither of these gentlemen has ever found more than one egg in any nest."

Howard Campbell also found one egg only in a nest near Ooty on the 2nd March, but this was fresh and more might have been laid.

In Burma, near Tharrawaddy, Hopwood found two eggs in a hole 12 feet up in a dead tree on the 30th May.

It would appear from the above notes that the breeding season in South India is December to March and in Burma May. It would, however, be unsafe to assert that one egg is the maximum laid.

The only three eggs I have measured are 26.8×19.8 (Ooty), 28.7×21.1 and 29.2×20.5 mm. (Tharrawaddy).

(1407) *Chrysocolaptes guttacristatus stricklandi* (Layard).

THE CEYLON CRIMSON-BACKED WOODPECKER.

Chrysocolaptes guttacristatus stricklandi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 81.

This Woodpecker is confined to Ceylon.

Wait writes of the nidification of this bird:—"It would appear to have much the same habits as *C. festivus*. The first brood is hatched early in the year and I have once found an addled egg with two young ones in September. Oftener only one egg is laid."

Against this it must be noted that Jenkins took three eggs "from a hole in a tree in a clearing in forest, about ten feet from the ground, on the 18th February"; while Phillips obtained another three on the 18th April "from a hole in a tree in the jungle."

Hemicircus canente.

THE HEART-SPOTTED WOODPECKER.

(1409) *Hemicircus canente canente* (Less.).

THE BURMESE HEART-SPOTTED WOODPECKER.

Hemicircus canente canente, Fauna B. I., Birds, 2nd ed. vol. iv. p. 84.

This Woodpecker is found over the whole of Burma both in the plains and hills up to about 3,000 feet; it extends into the Northern

half of the Malay States, East to Siam and Cochin China and North-West to Assam South of the Brahmapootra.

In Burma Davison, Bingham and Darling found it breeding in thin scrub and small tree-jungle and in open forest. The nest-holes were bored in dead stumps of trees, one in a branch of a huge tree in a jungle-clearing about 40 feet from the ground, the others 10 feet and 6 feet high in the dead trunks. Davison gives the size of the entrance-hole to the nest found by him as 1 inch wide by $1\frac{1}{4}$ high, but Bingham and Darling both describe it as circular and a little over an inch in diameter. The entrance found by Darling went into the tree "4 inches, then downwards $6\frac{1}{2}$, and terminating in a chamber about 5 inches in diameter."

Inglis took one clutch of eggs in Cachar from a hole only 9 feet up in the trunk of a solitary tree in a Tea-garden, but the only two nests taken by myself in that district were in small branches of live trees about 35 and 30 feet from the ground.

In Burma the breeding season is from December to March and again in July, but in Assam February to April only, though this time may be greatly extended when more is known about its breeding.

Three eggs form the full complement, sometimes two only.

Fifteen eggs average 23.8×17.8 mm.: maxima 25.1×18.0 and 24.2×18.2 mm.; minima 22.3×17.5 mm.

In 1931 one of my correspondents obtained three eggs from a nest-hole 30 feet from the ground on the 2nd April. Passing the same tree on the 18th he was surprised to see one of the birds leave the hole by the large entrance he had had to cut out, and inspection showed that there were three more eggs. No new nest-hole entrance had been made. I think it is unusual for any Woodpecker to return to its home after it has been robbed, though I have known of a few other instances in which it has done so.

(1410) *Hemicircus canente cordatus* Jerdon.

THE MALABAR HEART-SPOTTED WOODPECKER.

Hemicircus canente cordatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 85.

This little Woodpecker is found only on the West coast of India from Kanara South to the whole of Travancore.

It is, apparently, a forest bird, though not keeping very closely to dense forest. It occurs from the plains up to about 4,000 feet.

There is nothing on record about its nidification except that Bourdillon found it breeding in South Travancore in February.

I have two clutches of eggs taken by Stewart in that province from holes made in dead branches of high trees at great heights from the ground. Each clutch consists of three eggs, and they were taken on the 8th January and the 3rd May; the latter Stewart thought was probably an unusual date.

Eight eggs average 23.5×18.6 mm.: maxima 24.4×17.5 and 23.3×20.0 mm.; minima 23.0×17.5 mm.

Mulleripicus pulverulentus (Temm.).**THE GREAT SLATY WOODPECKER.****(1411) Mulleripicus pulverulentus harterti Hesse.****THE INDIAN GREAT SLATY WOODPECKER.**

Mulleripicus pulverulentus harterti, Fauna B. I., Birds, 2nd ed. vol. iv. p. 86.

This, the grandest of all our Oriental Woodpeckers, occurs throughout the Terai from Kuman to Eastern Assam and Manipur, spreading thence through practically the whole of Burma to the extreme South of the Malay States. East it is found in Siam, Annam and Cochin China.

The Great Slaty Woodpecker is a bird frequenting, in preference, open park-like country but sometimes breeding in very dense humid forest. I have also found it nesting in gigantic solitary *Bombax*-trees standing towering over dwarf scrub or low secondary growth and, again, I have known it to breed in dead trees in cultivation clearings in the middle of forest. It occurs in the low hills and in the plains. Rarely it ascends to about 4,000 feet when there are open grass-lands and scattered trees, but it is most numerous between 2,000 and 3,000 feet. Wherever it may be its raucous voice and the extraordinarily loud reverberations of its tapping soon draw attention to its presence.

In North Cachar its favourite breeding place is in one of the huge swellings so often seen in lofty branches of *Bombax malabarica*. These diseased swellings soon rot inside, though retaining the hard outer shell, and the birds, drilling through this for some 2 to 3 inches, then excavate a chamber which may be 10 to 20 inches in diameter. The entrance is roughly 4 to 5 inches across. These diseased branches are often at enormous heights and are quite unattainable unless one has days to devote to building bamboo-spike ladders up the great branchless trunks. The first I ever found must have been fully 70 feet from the ground and took two days to negotiate. When situated in dead trees in clearings they are sometimes placed between 20 and 30 feet up and are got at rather more easily, provided the tree is not too rotten to render climbing unsafe. I should think, however, that of the fifteen or twenty nest-holes I have seen, not more than five or six were approachable and, of these, only two held eggs. On one occasion I was surprised to find a nest-hole bored into a natural hollow, not 3 feet from the ground, in an enormous dead tree in heavy forest.

Bingham also found a nest-hole in Tenasserim cut in a very large kanyin-tree (*Dipterocarpus alatus*) which had blown down and, falling across the Winsaw stream, made a convenient bridge. The Woodpeckers had bored a hole in the side of this natural bridge, which

on the 5th April contained two fresh eggs. In April 1906 MacDonald found four slightly set eggs in a hole in a dead tree 20 feet from the ground near Pakkokku, and on the 26th of April Hopwood found two young and two addled eggs in a dead tree in the Upper Chindwin.

The breeding season is March to May, and I think few eggs are laid after the first half of April, though I once found three fresh eggs on the 14th June.

The birds lay three or four eggs, one as often as the other, typical Woodpeckers' eggs but of immense size.

Fourteen eggs average 39.1×29.4 mm. : maxima 43.2×30.5 mm. : minima 32.0×28.0 and 34.1×27.4 mm.

I have never succeeded in catching a bird on the eggs, but shot a male as he left the hole, so the male certainly takes his share of incubation, and I have seen both birds of a pair engaged in hammering out the entrance to a nest-hole.

This Woodpecker returns year after year to the same nesting place. When this is a chamber cut out of one of the diseased excrescences in a *Bombax* the same entrance and chamber are used again but, when in a rotten tree, fresh entrances are cut every year, and Hopwood found no less than seven entrances to the nesting-chamber from which he obtained eggs in the Lower Chindwin.

Macropicus javensis (Horsf.).

THE GREAT BLACK WOODPECKER.

(1413) *Macropicus javensis crawfurdi* * (Griffith).

THE BURMESE GREAT BLACK WOODPECKER.

Thriponax javanensis feddeni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 89.

Macropicus crawfurdi crawfurdi, *ibid.* vol. viii, p. 674.

The Great Black Woodpecker is found in Burma from the Chin, Kachin and Shan hills to the North of Tenasserim, both in the plains adjacent to the ranges and in the hills up to some 4,000 feet or, perhaps, a little over.

Like the Slaty Woodpeckers, they frequent both quite open, well-wooded country and dense forest, while for breeding purposes it seems to be particularly fond of large dead trees standing in cultivation clearings in forest.

Mr. F. Grant was apparently the first collector to find the eggs of this bird, sending me a clutch of three taken on the 23rd May, 1904, taken "from a chamber excavated in a small tree standing in a cultivation clearing in heavy forest."

* Under the rules of Zoological nomenclature, as pointed out by Ticehurst (J. B. N. H. S. vol. xxxvi, p. 933, 1933), *javanensis* of Ljungh does not invalidate *javensis* of Horsfield.

Cook describes the taking of the eggs (Journ. Bomb. Nat. Hist. Soc. vol. xxi, pp. 1081 & 1086, 1912):—"Today (February 6th) I have obtained the eggs of this species from a tree close to my present camp, about 15 miles East of Thayetmyo.

"The Letphan-tree in which the hole was made, was about two feet in circumference, the hole was situated about 14 feet from the base, and lying at the foot of the tree was a small heap of soft wood-chips of the Woodpecker's excavating. Had it not been for the thorny spikes with which the stem was covered, the tree presented no difficulties in climbing. These spikes, however, we knocked off with a stick and I swarmed up the tree, but was disappointed to find I could not reach the bottom of the hole, as the entrance was too small to allow more than half of the forearm to pass through. The attendant could do no better.

"Today I sent one of my servants, a small boy, whose arm would be likely to pass through the hole to feel in the nest for eggs. Alas, quite contrary to my orders, not only did he feel for the eggs, but he took the two and brought them back to me. Had I known there were eggs, I would have had them taken in my presence, and, at the same time, shot the parent bird.

"Apparently the nest-hole was one foot deep and, so far as I could feel, almost the whole of the small tree had been hollowed out, and only a thin surrounding wall, about 2 inches thick, being left.

"The incubation of the eggs had well set in and in another five days would have been impossible to blow."

On p. 1086 is the following further note by Cook:—

"On the 18th of the same month, I noticed another bird of the same species excavating the nest-hole. I watched the nest, and on March 1st took from it two fresh eggs.

"*Thriponax feddeni* seems to be an early breeder and somewhat irregular, as just about the same date as I found the bird excavating its nest-hole my men found another nest of almost fully fledged young, the date being about February 17th."

Judging from the above the breeding season would appear to be January to March and very rarely in May, while the number of eggs laid is two or three.

Seven eggs average 33.3×23.8 mm.; maxima 35.0×22.8 and 33.4×25.0 mm.; minima 33.0×25.0 and 35.0×22.8 .

(1412) *Macropicus javensis leucogaster* (Valenc.).

THE MALAY GREAT BLACK WOODPECKER.

Thriponax javanensis javanensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 88.

Macropicus crawfurdi leucogaster, *ibid.*, vol. viii, p. 674.

This bird enters our limits in Tenasserim and is thence found over the whole Malay Peninsula to Java, Borneo and Sumatra. It is also found in Peninsular Siam.

It has not yet been recorded as breeding within our limits, but

will certainly be so sooner or later. In Borneo Major J. C. Moulton took "one egg from a nest-hole in the trunk of a tree standing in forest." The egg measures 36.8×26.4 mm. and was taken on the 4th February.

I have two eggs said to be of this bird taken on the 3rd February near Mergui from a nest-hole "made in a tree standing in dense forest at about 25 feet from the ground."

These two eggs measure 35.6×23.4 and 35.6×23.5 mm. The man who collected these for me knew his birds well, and they are too large to be those of any other Woodpecker breeding near Mergui.

(1414) *Macropicus javensis hodgsonii* (Jerdon).

THE MALABAR GREAT BLACK WOODPECKER.

Thriponax javonensis hodgsonii, Fauna B. I., Birds, 2nd ed. vol. iv, p. 90.
Macropicus cravfurdi hodgsonii, ibid. vol. viii, p. 674.

The Southern race of this grand Woodpecker occurs on the South-Western coast of India from Travancore about as far North as Belgaum.

This bird seems to be entirely one of heavy forests. Bourdillon says it is found from 500 to 3,000 feet and that in "the Cardamom hills, where the forests are only thinned and the undergrowth removed to make room for the cardamoms, they are fairly common."

Davidson never succeeded in taking eggs, but writes (Journ. Bomb. Nat. Hist. Soc. vol. vi, p. 335, 1891):—"I saw a pair close to an enormous dead and rotten tree at Katgul, in February. The tree contained several old nest-holes, and one of the birds entered and left one of these. The tree was so rotten that no one could possibly climb it; I, however, visited it again in the early morning and again in the evening, and on both occasions fired a shot at it."

Kinloch managed to obtain two eggs in the Nelliampathy Hills on the 17th January. In a letter he writes:—"It was an awful business getting these eggs. The hole was bored in an enormous dead tree at about 30 feet from the ground, but the tree was so shaky that no one could climb it by the usual means of a ladder of pegs. Eventually we did get up to it by making a bamboo ladder, so strong that it hardly had to lean against the tree, and while the climber went up other men held a long rope twisted round another tree and tied to the top of the ladder. This was lowered to the nest, and the man thrust his arm through one of the many entrances and was at once able to grab the two eggs which I am sending you."

The two eggs measure 35.2×23.2 and 35.6×23.5 mm.

Davidson says that he has never seen more than one young one with the parent birds so, presumably, one egg only often constitutes the full clutch.

(1415) *Macropicus hodgei* (Blyth).

THE ANDAMAN BLACK WOODPECKER.

Thriponax hodgei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 91.*Macropicus hodgei*, *ibid.* vol. viii, p. 674.

This smaller species of Black Woodpecker is found in the Andamans only.

Wickham and Osmaston seem to be the only collectors who have taken the nests and eggs of this bird. A summary of their notes is as follows:—They breed in forest, generally selecting such as is rather open. The nest-holes are most often drilled in the trunk or in one of the larger branches of lofty trees at great heights from the ground, 30 feet being the usual height and 40 feet not uncommon. On the other hand, Osmaston took one only 20 feet up and Wickham one at 10 feet.

The birds breed in February and March, though some must lay a good deal earlier than this, as Wickham found young birds in one nest-hole on February the 15th.

Two or three eggs only are laid. Twelve average 33.4×23.3 mm.; maxima 36.6×24.5 mm.; minima 32.1×22.3 and 33.0×22.0 mm.

Subfamily PICUMNINÆ

(PICULETS).

Vivia innominata.

THE SPECKLED PICULET.

(1416) *Vivia innominata innominata* * (Burton).

THE HIMALAYAN SPECKLED PICULET.

Picumnus innominatus innominatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 92.*Vivia innominata innominata*, *ibid.* vol. vii, p. 320.

This quaint little Piculet is found in the Outer Himalayas from Kumaon and Dharmasala to Eastern Assam, both North and South of the Brahmapootra River. The Manipur birds should also be included in this race.

Over the whole of their range this bird occurs from the foot-hills and adjacent plains up to some 4,000 feet, here and there ascending

* Ticehurst (Bull. B. O. C. vol. liv, p. 20, 1933) separates the Western Himalayan birds under the name of *simlaensis* on the grounds of their greater size; twenty-one Eastern birds, wing 54 to 59 mm.; Western birds, 59 mm. upwards. I have had Cachar birds with wings 60 mm., and cannot separate Eastern and Western forms.

a good deal higher. Stoliczka has recorded it at 9,000 feet in the Western Himalayas, while it breeds about Naini Tal at 5,000 to 6,000 feet, but in Sikkim is rare over 4,000 feet, though Gammie found eggs at 5,000, while in Assam it is most common between 1,000 and 3,000 feet.

The favourite resort everywhere seems to be secondary growth and mixed bamboo- and scrub-jungle with a mixture of small trees. In the West it occurs also in dense and light forest and in the East very often in jungle of small clump bamboo with bush and grass undergrowth.

In the Western Himalayas most birds drill their nest-holes in branches or trunks of small trees and saplings at heights between 3 and 15 feet from the ground, but in the Eastern Himalayas the great majority make use of bamboos for breeding purposes. The bamboos may be either dead or living but, if the latter, the birds generally select one which has a fault or diseased portion in which they can cut out the entrance-hole. Again, they nearly always choose a bamboo in which they can drill the entrance just below one node, so that the eggs can be deposited deep down on the node below at some distance from the entrance. They prefer clump bamboos to the single species, but I have seen occasional nests in the latter.

The entrance is very tiny, not more than an inch in diameter, and small bamboos are always chosen, so that the chamber is between 2 and 3 inches in diameter, the eggs of course being deposited on the bare wood or in the chips which have fallen inside from the drilling.

The breeding season is April and May. Gammie took two clutches in Sikkim in the former month, while Whympere and Marshall took clutches on the 6th and 20th of that month respectively. In Eastern Assam and Cachar I have taken eggs from the 14th March up to 26th July, but I think June and July eggs are second broods.

The normal clutch of eggs is three or four, but two only are often incubated. They are typical little Woodpeckers' eggs, pure white, exceptionally hard and strong and very glossy. In shape they are either spheroidal or very short, blunt ovals.

Thirty eggs average 14.8×12.0 mm.; maxima 16.0×12.7 and 15.1×13.1 mm.; minima 13.3×12.2 and 14.3×10.9 mm.

Both sexes perform incubation and both take a share in the drilling of the nest-hole.

The courtship display seems similar to that of the larger Woodpeckers, the male bird scuttling backwards and forwards on the bamboo while going through the same contortions as do the big birds, accompanied by continued squeaks, very like those of a Shrew, uttered by the female as well as the male.

I think incubation takes eleven days and the fledgling period only fourteen days.

Sasia ochracea.**THE RUFOUS PICULET.**(1419) **Sasia ochracea ochracea** Hodgs.**THE INDIAN RUFOUS PICULET.***Sasia ochracea ochracea*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 95.

The typical form of Rufous Piculet extends as far West as Mussoorie, where it was obtained by Mackinnon, while on the East it is found in the Himalayas to Eastern Assam, North of the Brahmapootra and in the Northern Chindwin, Kauri Kachin and Shan States. South of the Brahmapootra in Assam it is replaced by *S. o. querulivox*.

I think the Rufous Piculet keeps far more exclusively to bamboo-jungle than does the Speckled Piculet, but I have also found it in mixed scrub- and bamboo-jungle, in secondary growth and in small thin tree-jungle, intermixed with bamboos. In such cover it is found in the breeding season from the foot-hills up to some 5000 feet, while Stevens found it still plentiful at 6,000 feet round Gopaldhara in Sikkim. In Eastern Assam we found it common between the foot-hills and 3,000 feet.

Coltart and I took a few clutches of eggs at Margherita, all deposited in dead bamboos growing in mixed scrub- and bamboo-jungle. The three nest-holes we saw had been cut in decayed parts of the bamboo, tiny circular holes barely an inch in diameter, the hollow bamboos being internally 3 inches or under inside. The eggs rested on an inch or two of dead bamboo powder and chips from the drilling, and each clutch consisted of three eggs.

They seem to be much later breeders than *Vivia* or than the more Eastern race of *Sasia*, for eggs hitherto taken have all been found between the 25th May and 2nd July.

The eggs are indistinguishable from those of *Vivia*.

Twelve eggs average 15.9×12.7 mm.: maxima 17.0×12.9 and 16.0×13.0 mm.; minima 14.9×12.6 and 15.0×12.4 mm.

(1420) **Sasia ochracea querulivox** Stuart Baker.**THE CACHAR RUFOUS PICULET.***Sasia ochracea querulivox*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 96.

This little Piculet extends from Cachar, Sylhet and Manipur to the Chin Hills.

It is common in Cachar from the foot-hills up to 5,000 feet, but more especially so between 1,000 and 3,000, haunting bamboo-jungle or deserted cultivation surrounded by forests, in which small bamboo- and scrub-jungle is growing thinly.

It occasionally makes its nest-hole, never at any great height from the ground, in the branches of small trees. In these cases the

entrance is under an inch wide, the tunnel is 3 or 4 and the chamber about 4 by 3 inches or less. Fairly sound branches are chosen and the chambers are rarely made in dead wood.

Normally the holes are drilled in dead bamboos, and the birds have a curious affection for bamboos which have been cut through but left hanging, entangled in the clump from which they have been cut. My first nest was found when, out after a gaur, I was pushing as quickly as possible through some small clump bamboo-jungle. My head bumped against a hanging bit of dead bamboo, when out flew one of these little Woodpeckers. On my sitting quietly down, he returned in five minutes, was caught on the nest and released, whereupon he at once flew back to it and was caught a second time.

Sometimes the birds enter the bamboo by a cut made in it by the woodsman when working at the clump, but nearly always they bore the little entrance themselves, usually at a point where the bamboo has partly rotted. In width it varies from $\frac{3}{4}$ of an inch to 1 inch, and is generally just under the node above that on which the eggs are deposited.

Most eggs are laid in April, but I have taken them in June and again in the last week in March.

They number three or four, one as often as the other.

Forty eggs average 15.3×12.2 mm.; maxima 16.7×12.5 and 15.4×12.9 mm.; minima 14.0×12.0 and 14.4×11.5 mm.

Courtship display is very pretty and quite typical of the family. The little female crouches against a bamboo or trunk of a tree and the little male then flutters on to the same a foot or two above her, at once running rapidly backward towards her; arrived where she is, he then drops a few feet and runs up to her, seems to skip over her and run up the bamboo, and then go through all the procedure again, perhaps once or twice, perhaps half-a-dozen times before any thing further takes place. All the time the head and neck of both birds are twisted backwards and forwards, and volleys of little squeaks are uttered, growing louder and louder until the finale is reached.

(1422) *Sasia abnormis* (Temin.).

THE JAVAN RUFOUS PICULET.

Sasia abnormis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 98.

This Piculet ranges from Ye in Tenasserim, through the Malay States, to Sumatra, Java and Borneo.

As that I know of its breeding habits is that two eggs were sent me, with the skin of a bird for identification, which were taken near Ye in April, probably in the early part of the month.

They had been deposited in a hollow bamboo, but beyond this I could elicit no further information from the finder, to whom they were returned.

Subfamily IYNGINÆ

(WRYNECKS).

Iynx torquilla Linn.

THE WRYNECK.

(1424) *Iynx torquilla japonica* Bonap.

THE JAPANESE WRYNECK.

Iynx torquilla japonica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 100.

The Japanese Wryneck breeds, apparently, from Japan, through Manchuria and Central Asia, to the North-Western Himalayas. Brooks reported it as breeding at Ramu, Kashmir, "where it is not unfrequent." Ward also found it breeding in Kashmir, though I have no details.

Wilson obtained a clutch of eight eggs near Sonamarg, probably at about 9,000 feet, while Whitehead took another at Bulta Kundi in the Kurram Valley at 12,300 feet, these two nests being taken on the 13th and 20th June respectively, each containing eight eggs.

All that is reported about these two clutches is that they were laid in natural holes in trees, that taken by Whitehead being at "about 20 feet up."

Normally this bird lays its eggs in natural hollows in trees, making no nest, but depositing them on the bare wood or upon any rubbish which may be collected there.

The breeding season in Kashmir and also in Manchuria, whence I have had several clutches of eggs, is June. The number of eggs laid is probably six to fourteen, but every clutch I have seen has been of eight.

They are white, but not glossy like Woodpeckers' eggs, and in shape are ovals, often somewhat pointed at the smaller end.

Thirty-two eggs average 21.3×15.7 mm.; maxima 22.6×15.4 and 22.1×16.5 mm.; minima 20.1×15.6 and 20.3×14.7 mm.

Family CAPITONIDÆ

(BARBETS).

The Barbets are Scañsorial birds which deposit their eggs in holes in trees, the entrance to which is invariably drilled by the birds themselves, though the tunnel and chamber may be merely enlarged, shaped or partly made by them out of the soft or rotten interior. In many cases the entrance-hole penetrates direct into a natural hollow, in which no further work is needed. No nest is made, nor is a lining of any sort whatsoever made for the reception of the eggs, which are deposited on the bare wood or upon such dust or fragments of wood which may have collected there.

The eggs are invariably white, generally rather long in shape and sometimes distinctly pointed. The texture is strong and smooth, but there is no gloss, though the surface is satiny to the touch.

No Barbet's egg can, when freshly taken, be mistaken for a Woodpecker's egg, or *vice versa*, though eggs taken a very long time previously might be so in exceptional cases.

***Calorhamphus fuliginosus* (Temm.).**

THE BROWN BARBET.

(1425) ***Calorhamphus fuliginosus hayi* Gray.**

THE MALAYAN BROWN BARBET.

Calorhamphus fuliginosus hayi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 103.

It is only in the South of Tenasserim that this Barbet enters within our limits. Thence it extends through Southern Siam and the Malay States to Sumatra.

Davison describes this as a purely forest bird and never seen in gardens. With this Kellow agrees, for he never found this bird anywhere in the more open country round Taiping. In 1910, when making some clearings in very heavy forest during the month of February, he found a number of nest-holes, several of which contained each two eggs or young. The nest-holes "were all bored by the birds themselves in quite small dead trees standing either on the banks of streams running through evergreen forest or in natural openings in the same kind of forest."

Other nests were taken later by Mr. Kellow, and one male bird was sent to me for identification which had been caught in the nest-hole. It would seem, therefore, that the breeding season is January, February and March and that only two eggs are laid.

Eight eggs average 26.1×20.0 mm.; maxima 26.5×19.8 and 26.2×20.5 mm.; minima 25.0×19.6 mm.

Megalaima virens.**THE GREAT BARBET.****(1426) Megalaima virens virens (Bodd.).****THE CHINESE GREAT BARBET.**

Megalaima virens virens, Fauna B. I., Birds, 2nd ed. vol. iv, p. 104.

This grand Barbet is found in North-East, Central and Eastern Burma, South into Tenasserim and Peninsular Siam, and East in Yunnan and the Indo-Chinese countries into South China. All the races of this species are alike in that they frequent forests, and nearly always those which consist of lofty trees, a fair amount of undergrowth and more or less evergreen in character. Occasionally they may wander into more open country when attracted by trees in fruit, and I have seen them on various *Fici* standing in patches of cultivated ground. I do not, however, think they ever breed in trees in the open.

The present race is found as low down as 1,000 feet and as high, sometimes, as 7,000 feet.

Bingham obtained nests in Tenasserim in the Thoungyeen Valley, three nest-holes being drilled in upright stems of jungle-trees at between 20 and 30 feet from the ground. He describes the holes as mere entrances, some 3 inches long, bored into natural hollows.

The holes contained respectively three eggs, one egg with one young one, and two young ones.

They seem to breed from February to April; Bingham found his three nests between the 12th February and the 26th March. Hopwood found them breeding in the Upper Chindwin on 21st April, while Grey took one in Tenasserim on the 24th February.

They lay two or three eggs only.

Fourteen eggs average 34.3×26.5 mm. : maxima 39.2×28.6 mm. ; minima 30.4×25.4 mm.

(1427) Megalaima virens marshallorum Swinh.**THE HIMALAYAN GREAT BARBET.**

Megalaima virens marshallorum, Fauna B. I., Birds, 2nd ed. vol. iv, p. 106.

This race of Great Barbet is found in the Himalayas from Murree and Mussoorie on the West to Nepal on the East. Specimens from Sikkim somewhat approach *magnifica*, but are nearer to the present race, and should be retained under the same name. It is a bird of rather higher levels, about 3,000 to 8,000 feet, but otherwise haunts the same kind of country as the preceding form. Hume gives its elevation as from 4,000 to 6,000 feet, but Dodsworth took them far higher than this round Simla, while Rattray and Buchanan

found them breeding in the Galis between 6,000 and 8,000 feet. Round Naini Tal Whympers took eggs at about 5,000 feet. As a rule the birds excavate nest-holes for themselves, cutting an entrance some 3 inches in diameter either straight into natural hollows or else chambers cut out of the live wood and measuring some 7 inches across.

Dodsworth says that sometimes they make use of deserted Woodpeckers' nest-holes, but no one else has noticed this.

They are rather late breeders, laying from early May to the middle of July.

Whympers, in Naini Tal, and Rattray, in Murree, took eggs in the first week of May onwards, but Marshall (G. F. L.) found fresh eggs on the 23rd June in Naini Tal, and his brother, C. H. T., says that in Murree they lay in the end of June and early July.

The number of eggs laid is three or four.

There is no evidence that they are double-brooded.

Twenty-five eggs average 34.0×24.0 mm.: maxima 36.4×26.2 mm.; minima 32.2×24.0 mm.

(1428) *Megalaima virens magnifica* Stnart Baker.

THE ASSAM GREAT BARBET.

Megalaima virens magnifica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 107.

This race links up the range of the two preceding birds, breeding in Assam, North and South of the Brahmaputra, Manipur, Looshai and Chin Hills; the Hill Tracts of Tippera and Chittagong.

This Barbet, which really deserves the name of "magnificent," is very common in Assam, breeding in considerable numbers between 2,500 and 6,000 feet in Cachar and at least 2,000 feet higher in the Naga Hills.

Their nests were not hard to find, as the wailing cry of the male, a far-reaching "pio-pio-pio," constantly uttered during the breeding season, led one up to the spot where the hen sat on her eggs, and then all that was necessary was to tap each tree that seemed rotten until the bird flew off the eggs. If the cock was sitting, as was often the case, the female remained quite silent, probably because she was too busy feeding.

The nest-holes were always drilled in the main trunk of the tree or in one of the larger upright branches, and generally at a considerable height from the ground, though I have taken them at all heights between 10 and 30 feet.

I think the majority of birds breed in the second half of April and early May, but I have taken fresh eggs up to the 1st July. This, however, was almost certainly a second clutch laid by a pair whose first eggs had been taken in the end of May from a tree a few yards away.

In the Chin Hills Mackenzie found them laying in April and obtained eggs almost hatching on the 29th of that month.

The number of eggs laid is two or three, never four.

Thirty eggs average 34.9×24.3 mm.; maxima 36.5×24.9 and 33.2×26.1 mm.; minima 32.2×23.2 and 34.0×22.0 mm.

***Thereiceryx zeylanicus*.**

THE GREEN BARBET.

(1429) *Thereiceryx zeylanicus zeylanicus* (Gmelin).

THE CEYLON GREEN BARBET.

Thereiceryx zeylanicus zeylanicus, Fauna B. I., Birds, 2nd ed. vol. iv. p. 108.

The present race of Green Barbet is confined to Ceylon and the extreme South of Travancore. Here it frequents thin scrub-jungle, secondary growth and the edges of forests near cultivation, often coming into towns and villages and actually breeding in gardens, dead trees in avenues and in similar places. It occurs over the whole of the plains, except the most dry, and is found up to about 3,000 or 4,000 feet in the hills.

In Ceylon Wait notes that "this bird is very common in village gardens and thin jungle near cultivation.

"The nest-hole is hollowed out of a rotten tree or even a fence-post. The three dull white eggs are usually laid on a few stalks of dried grass which line the bottom of the cavity. There appear to be several broods, as I have taken eggs as early as March and as late as August."

Stewart took two nests in the extreme South of Travancore on the 7th March, both containing three eggs, so this number would seem to form the normal clutch.

Eighteen eggs, including Wait's, average 30.9×23.7 mm.; maxima 31.2×22.0 and 31.0×24.2 mm.; minima 27.5×21.2 mm.

(1430) *Thereiceryx zeylanicus caniceps* (Franklin).

THE NORTHERN GREEN BARBET.

Thereiceryx zeylanicus caniceps, Fauna B. I., Birds, 2nd ed. vol. iv. p. 110.

The Northern Green Barbet is found roughly North of the Bombay Presidency and of a line drawn South of Mt. Aboo to the mouth of the Cauvery. It occurs throughout the Himalayan Terai and as far East as Bihar and Western Bengal, straggling as far as Calcutta.

Where found this Barbet is the same familiar bird as the other races are, building in dead trees in avenues, gardens and the vicinity



THEREICERYX ZEYLANICUS CANICEPS.

The Northern Green Barbet.

(Pachmarhi, 3. 7. 26.)



of towns and villages. Two notes, one by Jesse from Lucknow and one given me by Coltart from Bihar, suffice to illustrate the nesting habits of this very common bird. Jesse says: "These Barbets and the Copper-Smith are equally common here and breed in similar places, generally in dead, or partly dead, trees beside the more jungly roads. The latter birds elects branches on the underside of which she makes her tunnel, but the Green Barbet more often drills her nest-hole in the trunk of the tree or in one of the main upright branches."

Coltart, however, says: "They seem to make their nest-holes here in any position and in any kind of tree, either by the roadside, in a tree in cultivated fields, or in a tree in an orchard or garden. The nest is seldom at any great height from the ground, most often between 10 and 12 feet."

My own experience agrees with Coltart's, but Hume says "we found no nest-hole at a less height than 20 feet, and one was at least 50 feet from the ground."

Mango-trees in orchards are certainly a very favourite nesting site. I think they prefer such as are slightly decayed inside but comparatively sound outside, yet I have taken eggs in a stump so rotten that it seemed a touch would upset it. This particular stump was almost riddled with holes, at least half-a-dozen, all leading into the same hollow, evidently occupied year after year.

The breeding season lasts from March to May. Hume says generally March and April; Beavan gives the same months for Manbhūm and Cock for Oudh, though he also took three fresh eggs in early June, while Coltart took eggs as late as the 23rd July, these probably being second broods.

The usual full clutch of eggs is three, less often four and, occasionally, two only.

Thirty eggs average 29.3×22.3 mm.: maxima 30.1×23.0 mm.; minima 27.3×20.7 and 29.3×20.1 mm.

Both sexes assist in boring the nest-entrance and tunnel. Cock says: "The holes are excavated in a wonderfully short time, considering the instrument the bird works with. I have watched the bird working continuously for some hours without stopping its work."

Those I have watched only worked for short spells, the males and females relieving each other every ten minutes or so.

(1431) *Thereiceryx zeylanicus inornatus* (Wakden).

THE BOMBAY GREEN BARBET.

Thereiceryx zeylanicus inornatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 110.

This subspecies of Green Barbet is found in Western India South of the range of the preceding bird down to Travancore, excluding

the extreme South. East it extends to the Nilgiris and Cannanore, in the former of which its eggs have been repeatedly taken.

There is nothing to record about the nidification of this bird which is different to that of the preceding.

Butler found it breeding on "Mt. Aboo on the 8th April," and took four fresh eggs, while Davidson says that it is common in Khandesh, "breeding in April and laying generally three eggs, though I have found only two eggs, nearly incubated." Col. R. H. Baker and General Betham obtained eggs early in April on the Nilgiris.

Eighteen eggs average 30.5×21.8 mm. : maxima 32.1×21.2 and 29.5×23.1 mm. ; minima 28.7×22.4 and 30.2×20.8 mm.

***Thereiceryx lineatus* (Vieill.).**

THE LINEATED BARBET.

(1432) *Thereiceryx lineatus hodgsoni* (Bonap.).

THE ASSAM LINEATED BARBET.

Thereiceryx lineatus hodgsoni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 111.

The Assam Lineated Barbet occurs in the Outer Lower Himalayas from Kumaon and Mussoorie to Eastern Assam, and thence through Northern Burma to the Northern Shan States. Birds from all these areas are quite typical *hodgsoni*, but in the Southern Chin Hills and Lower Chindwin the birds are quite indeterminable, while those from the Southern Shan State and Karenni are nearer the next form.

It is to be found in the plains all along the foot of the hills and also in the hills up to about 4,000 feet, though it is not common over 3,000. West of Northern Bihar and Assam it seems to occur but rarely in the plains, but I have recently heard of it breeding below the Oudh Terai.

It is equally a bird of the forest and of cultivated and open country near forest, but is nowhere the familiar village bird that the Green Barbet is. Its breeding habits are, however, very much the same as those of that bird. One curious feature of its nesting which I have noticed is its habit of sometimes making the entrance to its nest-hole on the upper surface of large branches but, when so made, they are always more or less protected from rain by dense overhanging foliage or by other boughs. Nearly all the nests I have found have been between 6 and 16 feet from the ground but, occasionally, they may be found at 30 or even 40 feet from it. The entrance is large, sometimes as much as $3\frac{1}{2}$ inches across, while the tunnel may be anything from 2 to 20 inches in length. If cut

into rotten timber the chamber may be any size, but if the hole is drilled in fairly sound wood it is generally about 7 inches deep by nearly 6 wide.

The breeding season is from the end of March to the middle of June. In Assam April and May are equally popular, but in Kuman on the West and Northern Burma on the East most eggs are laid in the first half of April.

The number of eggs laid varies from two to four.

One hundred eggs, from among which all eggs from doubtful areas have been excluded, average 32.0×22.9 mm.: maxima 33.1×23.2 and 31.6×24.8 mm.; minima 27.0×21.3 and 27.2×19.5 mm.

I have repeatedly caught the male bird on the eggs, and Cripps also caught a male on its eggs in Sylhet, so this sex undoubtedly shares in incubation, as also in the work of drilling. The time taken for this varies according to the condition of the tree chosen, but is much shorter than one would have expected. In fairly sound wood the whole business of drilling entrance, tunnel and chamber is completed in about a week while, in rotten wood, three or four days suffice for the purpose.

The birds work very hard for three or four hours at a time, relieving one another at intervals of ten to twenty minutes.

I cannot be absolutely sure, but I think incubation takes fourteen to fifteen days and the fledging period twenty-four days.

(1433) *Thereiceryx lineatus intermedius* Stuart Baker.

THE BURMESE LINEATED BARBET.

Thereiceryx lineatus intermedius, Fauna B. I., Birds, 2nd ed. vol. iv, p. 113.

This Southern form of the preceding bird is found all over Central and South Burma and the Malay States to Patani. East it occurs from the Southern Shan States, through Siam, Annam and Cochin China.

The breeding habits of this race are just the same as those of the preceding bird.

Oates notes of one nest taken by him that it was on the upper side of a branch. This was found with two fully-fledged young on the 8th May, while two nests were taken by Bingham, one on the 25th March with three fresh eggs and one on the 13th April with young.

In the Lower Chindwin and in Tenasserim Hopwood and Mackenzie found eggs from March to May, while Grant took one clutch as late as the 23rd July.

The eggs number three or four, and twenty average 30.2×22.5 mm.: maxima 32.0×24.0 mm.; minima 28.5×22.2 and 29.1×20.2 mm.

(1434) *Therecieryx viridis* (Bodd.).

THE SMALL GREEN BARBET.

Therecieryx viridis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 113.

This little Barbet ranges from about the latitude of Mahableshwar, Belgaum and the whole of the Deccan to the hill-ranges of South Travancore.

It is never found in evergreen or really heavy forest, but with this exception frequents almost any kind of well-wooded country from the foot-hills up to the summits of the highest hills of Southern India. It is quite one of the best known and most familiar of birds in the Nilgiris and other parts of South-West India, breeding in gardens and villages, by roadsides and in orchards, or in trees and old stumps standing in cultivation. It prefers trees which are partly or wholly decayed, but sometimes drills its nest-hole in quite sound wood. In Travancore Bourdillon says that though the bird is exceedingly common, eggs are hard to get, as the birds breed in such rotten trees that they cannot be climbed.

The nest-hole may be made at any height from 5 to 25 feet from the ground while, occasionally, they excavate them, according to Butler, at heights of 50 and even 60 feet.

They return year after year to the same tree, each year cutting out a new entrance, generally into the old chamber but, sometimes, into a new one. Nine entrances have been found in one tree all leading to the same chamber. Darling says that in the Nilgiris he has taken five clutches of eggs or young from nest-holes all made in the same tree, but the most any other collector has recorded is two nest-holes in the same tree but far apart.

They are most tenacious in keeping to their nesting sites. Butler records again and again having taken two or more clutches of eggs from the same nest-hole without driving the birds away. From one he records taking clutches of eggs on the 23rd March, 8th and 23rd April and 6th May. His notes, given below, are very interesting :—"The birds are not at all shy when breeding; but as it is difficult to know when to cut into the nest, as it takes them a long time to excavate the egg-chamber, I have usually adopted the following plan, namely, to watch the birds from time to time when they are boring, when, as a rule, as you approach they come to the mouth of the hole and fly out. As soon, however, as the eggs are deposited, instead of flying out, the hen bird usually peeps cautiously out of the hole, and remains motionless, with her head projecting from the entrance, remaining thus until you move away, when, if you have not frightened her, she will gradually withdraw her head and sink down into the hole again. Having satisfied myself that there are eggs, I next proceed to cut a wedge out with a saw as neatly as possible on the upper side of the bough, opposite the egg-chamber (or a little above it), which is usually about 9 inches from the entrance, and if there are eggs remove them, carefully

replacing the wedge; the birds will probably then lay again in a few days in the same hole, and in some instances will go on laying again and again until the end of the season. As a rule the holes are bored in dead branches on the underside, though in some instances they are bored in green wood."

In the Nelliampathy Hills Kinloch found them breeding in February, and elsewhere they occasionally breed in March, but April and May are undoubtedly the normal breeding months.

As a rule three eggs are laid, sometimes two only and very rarely four.

Thirty eggs average 26.2×20.3 mm.; maxima 29.0×19.9 and 27.1×21.6 mm.; minima 24.6×19.3 and 27.0×18.9 mm.

Cyanops asiatica.

THE BLUE-THROATED BARBET.

(1436) *Cyanops asiatica asiatica* (Lath.).

THE BENGAL BLUE-THROATED BARBET.

Cyanops asiatica asiatica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 116.

This Blue-throated Barbet extends from Kashmir and Kuman, through the Simla States and Garhwal, where it is rare, to Eastern Bengal and Assam. Thence it extends East to Siam and South to the hilly country of Northern Tenasserim.

This is a Barbet of forest or very heavily wooded country, rarely breeding in trees in open cultivation. It breeds from the foot-hills up to about 4,000 feet in South Assam, but in the true Himalayas North of the Brahmapootra it occurs at much higher elevations, probably up to 8,000 feet.

I have seen an immense number of nest-holes of this Barbet, which is extraordinarily common in the Surrma Valley hills. These were all quite typical Barbet nest-holes in trees, cut out by the birds themselves, generally in the larger limbs or the trunks of trees at heights varying from 5 to 25 feet from the ground. Sometimes the holes are drilled in smaller branches at greater heights, but these are exceptional. If drilled in branches the entrance is always on the underside and, in most cases, trees are selected in which the trunk or some of the branches are more or less decayed inside. The entrance is roughly 2 to 3 inches wide, while the tunnel may be anything from 4 inches to a foot in length, leading into a wider chamber from 4 to 6 inches in diameter. The eggs are always in my experience laid on the bare wood or on a bed of chips of touch-wood, collected as they fell during boring operations. I have never seen a lining of any kind in the holes, but Hume writes of some nest-holes:—"The one first mentioned had a large pad of shavings, apparently taken off by a plane and collected by the birds."

"Another nest-hole found in July, containing three eggs, had also in it a large pad consisting almost exclusively of coarse fibre,

apparently strips of bark of some herbaceous plant, but a few pieces of grass, a piece of red wool, and one or two similar miscellaneous scraps are intermingled in the pad."

I should imagine that in both these instances the Barbets' residence had been temporarily occupied by Magpie-Robins or some other bird.

Unlike most Barbets, this species is, I think, double brooded, rearing two broods in the same nest-hole and returning, like all Barbets, year after year to the same chamber, but often making a new entrance.

In the higher elevations the breeding season seems to be restricted to May and June, a few birds breeding in July. In Assam we found eggs regularly from March to June and, but rarely, as late as August.

The normal full clutch of eggs is three or four, occasionally five.

Forty eggs average 27.8×20.5 mm.: maxima 30.0×20.8 and 28.1×22.1 mm.; minima 25.0×20.0 and 27.1×19.8 mm.

(1437) *Cyanops asiatica davisoni* Hume.

THE BURMESE BLUE-THROATED BARBET.

Cyanops asiatica davisoni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 118.

This race of the Blue-throated Barbet occurs in Tenasserim from Tavoy southwards, meeting *C. a. chersonesus* somewhere about Victoria Point. North it probably extends through Karenni to the South Shan States, where Rippon obtained typical specimens. Its breeding habits differ in no way from those of the preceding race, but the only note recorded about it is that of Davison in 'Nests and Eggs.'

On the 16th and 20th March near the head-waters of the Meplay chong, Davison obtained two clutches each of three eggs from nest-holes cut in semi-rotten branches of pyma-trees (*Lagerstrœmia flos-reginæ*). Both entrances had been bored, as usual, on the under-side of the branch. One egg was broken, but the other three measured 28.7×20.7 , 28.7×20.7 and 27.4×19.8 mm.

(1438) *Cyanops asiatica rubescens* Stuart Baker.

THE RUDDY BARBET.

Cyanops asiatica rubescens, Fauna B. I., Birds, 2nd ed. vol. iv, p. 119.

So far this brilliantly coloured Barbet has only been found breeding in the North Cachar and Khasia Hills, but it occurs in the highest ranges of Manipur and the Looshai Hills, and Inglis obtained Winter specimens in the Dooars.

In Cachar and the Khasia Hills I obtained a few clutches of eggs from nest-holes made in trees growing in the most dense and humid forests between 5,000 and 6,000 feet or else in trees standing in cultivation clearings in these same forests.

In every way the nidification of this bird agrees with that of the typical form, but the clutches of eggs, so far as I have seen, are always three in number and are slightly larger than those of that bird. All my eggs have been taken between the 14th and end of May, but some birds undoubtedly breed in June and possibly early July, as I have seen a bird excavating an entrance in the first week of June.

Fifteen eggs average 29.2×21.0 mm. : maxima 31.0×20.3 and 30.5×23.0 mm. : minima 28.3×20.7 and 29.0×20.0 mm.

(1440) *Cyanops flavifrons* (Cuvier).

THE YELLOW-FRONTED BARBET.

Cyanops flavifrons, Fauna B. I., Birds, 2nd ed. vol. iv, p. 120.

This little Barbet is confined to Ceylon, where it occurs, according to Wait ('Birds of Ceylon,' 2nd ed. p. 167), "chiefly in the hill zone, except at the highest altitudes. From the bases of the hills it spreads into the damp low country zone. In the drier forests it is more restricted, but is found locally in parts of the Eastern Province and the district North of the Matale hills."

Phillips found these Barbets breeding in some numbers in the Gammaduwa district at an elevation of about 3,000 to 3,500 feet, making their nest-holes in trees standing in Tea cultivation, those selected being generally at the edge of the forest. The holes were drilled both in large and small branches and in the trunks of the trees at heights between 6 and 25 feet from the ground. One or two nest-holes were bored in quite rotten stumps comparatively near the ground.

Wait says that eggs may be taken at almost any time of the year, but Tunnard and Phillips found that there were two definite seasons during which most birds bred, the first in February and March and the second in August.

Three eggs are nearly always laid, rarely two only.

Thirty-eight eggs average 26.6×20.7 mm. : maxima 29.9×22.0 mm. : minima 25.0×20.0 and 25.3×19.9 mm.

Cyanops duvaucellii (Lesson).

THE BLUE-EARED BARBET.

(1441) *Cyanops duvaucellii cyanotis* (Blyth).

THE INDIAN BLUE-EARED BARBET.

Cyanops duvaucellii cyanotis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 121.

This Blue-eared Barbet is found between 1,000 and 5,000 feet in the Outer Himalayas from Sikkim to Eastern Assam and thence South through Burma to the North of Tenasserim and East to Siam.

As a rule this bird is most common about 2,000 to 3,000 feet, but it breeds freely in Assam up to 4,000 feet, while both Coltart and I found it breeding in the evergreen forest of the foot-hills in Lakhimpur down to 700 feet. Its nest-hole is in most cases drilled in the trunks or larger vertical boughs of trees in dense forest, but I have known the birds to use large and small dead trees in cultivation surrounded by forest and others in secondary growth or small tree-and scrub-jungle. The entrance is small, not exceeding $1\frac{1}{2}$ inch in diameter, while the tunnel varies according to the soundness of the timber in which it is bored. In quite green wood it is only a few inches long, but in really rotten timber it may be over a foot long. The chamber, if dug out by the birds, averages about 4 inches in diameter. The eggs are, as usual, laid either on the bare wood or upon whatever rubbish may have accumulated at the bottom of the hole.

The male and female work on the excavation in short reliefs for some three hours or so in the mornings and evenings, and the entire preparation vary with the condition of the tree. I have known the entrance take a couple of days and the hollowing out of the chamber completed in two more. On the other hand, I have seen birds working at an entrance for four or five days and then give up the attempt and start afresh on a softer place either on the same or another tree.

The breeding season is April, May and early June and, so far as I am aware, only one brood is raised.

The eggs number two to four, and it is rather curious that when I have seen four eggs or young there has often appeared to be an interval of two or three days between the laying of the second and third eggs.

Forty eggs average 24.5×18.3 mm. : maxima 26.5×20.4 mm. ; minima 21.6×17.0 mm.

I do not think this Barbet returns very regularly to the same tree year after year for nesting purposes. I have seen three entrances obviously leading to the same chamber, but this is exceptional, and often the bird selects a new site every season.

(1442) *Cyanops duvaucelii stuarti* Rob. & Kloss.

THE TENASSERIM BLUE-THROATED BARBET.

Cyanops duvaucelii stuarti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 123.

This subspecies is restricted by Robinson and Kloss to Tenasserim and Peninsular Siam, possibly just extending into the extreme North of the Federated Malay States.

Since Darling and Bingham took the nests of this Barbet in Tavoy and the Thongyeen Valley no one else seems to have found them. The latter took two eggs on the 12th February from a tall dead pintado-tree in a deserted cultivation clearing in forest. Bingham says :—" In getting under the tree I discovered a tiny hole, and

immediately sent a peon up to see if there were any eggs. As he got on the next branch below the one in which the hole was the little bird darted out, and though I fired hastily I missed; however, I had identified it, so I didn't much care. After cutting and hacking for some time at the branch, which was decayed more or less, the man managed to get his hand in and shouted out that there were two eggs lying on the bare wood.

"The nest-hole ran about six inches into the branch downwards, and the entrance looked as if it had been about an inch in diameter. The two eggs measure respectively 1 and 0.97 by 0.7 and 0.69."

The nest found by Darling was very similar, and contained three eggs measuring 0.92, 0.9 and 0.85 in length by 0.68, 0.65 and 0.65 in breadth.

The above five eggs average 23.6×17.3 mm.

(1443) *Cyanops robustirostris* Stuart Baker.

THE THICK-BILLED BARBET.

Cyanops robustirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 123.

I discovered this little Barbet in North Cachar, but even there it was very rare. Rippon obtained a specimen in Karenni and Mr. W. Peddie found it twice in the Naogang district, adjoining the North Cachar Hills. It is a bird of dense forest or exceptionally well wooded country, and Peddie and I only found them on trees alongside streams, but really very little is known about the bird or its habits.

I took four eggs on the 29th May from a large Ficus-tree standing beside a rest-house on the Diyung stream. The entrance was drilled in the side of a stout horizontal branch about 20 feet from the ground. It measured about $1\frac{1}{2}$ inch in diameter, the tunnel being nearly 2 feet long, in rotten wood, terminating in a chamber about 6 by 6 inches.

The four eggs, which were hard set, measured 24.0×16.3 , 23.8×16.4 , 23.7×16.4 and 23.5×16.2 mm.

A second clutch brought in to me with a bird was quite similar, but I gave it to Mr. J. Davidson without measuring the eggs.

Cyanops franklinii.

THE GOLDEN-THROATED BARBET.

(1444) *Cyanops franklinii franklinii* Blyth.

THE INDIAN GOLDEN-THROATED BARBET.

Cyanops franklinii franklinii, Fauna B. I., Birds, 2nd ed. vol. iv, p. 124.

This Barbet extends from Nepal and Sikkim East to the Chin Hills. It is most common in the Surma Valley, Manipur and the

Chin Hills, breeding freely between 2,000 and 6,000 feet, but principally between 3,000 and 4,500 feet. It keeps to dense forest of tall trees with ample undergrowth and, even in these, nearly always sits in those with very ample foliage.

In Assam it undoubtedly prefers, for nesting purposes, the very rotten stumps of old dead trees standing beside streams or bridle-paths in rugged country, broken hill-sides and rocky ravines. In these stumps it excavates its nest-hole at any height between 4 and 12 feet from the ground. Occasionally it may drill a hole in a branch the outer crust of which is fairly sound, while the tunnel and chamber is, without exception, bored out of rotten wood and, even then, is short and carelessly made. I have taken eggs from a natural hollow, the entrance into it being made by the Barbets enlarging a natural crevice. When made in very rotten wood the entrance is often large and ragged. The first nest I ever found was in a very rotten stump, which we pulled to the ground after lassoing the top with the reins from my pony's bridle. The entrance-hole in this stump was full 3 inches in diameter and very ragged at the edges, while the hollow was a natural one in the heart of the stump about 6 inches below the entrance.

The male bird does incubate, as we have trapped him on the eggs, but he spends most of his time sitting close to his nest and constantly uttering his loud wailing cry of "pee-yu, pee-yu," thus giving away the site.

The breeding season lasts from the end of April to the middle of June, but three out of four eggs are laid in May.

The usual full clutch is three or four, but sometimes two only are laid, while five is not very rare.

Fifty eggs average 27.4×21.1 mm.: maxima 29.2×21.3 and 28.6×22.0 mm.; minima 25.0×20.0 and 26.0×18.8 mm.

In shape the eggs vary from rather long to broad blunt ovals, and I have one or two clutches which are almost elliptical.

(1445) *Cyanops franklinii ramsayi* Walden.

THE KARENNI GOLDEN-THROATED BARBET.

Cyanops franklinii ramsayi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 125.

Ramsay's Barbet, as this bird has hitherto been called, ranges from the Shan States to about the latitude of Muleyit in Tenasserim and, perhaps, some distance further South.

It inhabits the same kind of country as the preceding bird and is found from about 2,000 feet to the highest peaks.

Very little is known about its nidification. Hopwood obtained three eggs from a hole at the top of a rotten stump, about 20 feet from the ground, on the 27th April, and on the same date five years previously Cook took four eggs, near Kellaw, from a hole in a dead

stump about 6 feet from the ground. I have also three eggs in my collection (a pair and a single egg) taken by Bingham on Mt. Muleyit on the 10th and 7th May respectively.

From the above we may take the breeding season as being April and May, while the full clutch of eggs is probably three or four.

Ten eggs average 28.6×20.7 mm.: maxima 31.7×20.7 and 27.3×21.5 mm.; minima 26.5×20.8 and 27.0×20.0 mm.

Xantholæma hæmacephala Müll.

THE CRIMSON-BREASTED BARBET.

(1446) *Xantholæma hæmacephala indica* Lath.

THE BURMESE CRIMSON-BREASTED BARBET.

Xantholæma hæmacephala indica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 127.

This Barbet, more generally known as the Copper-smith, on account of its curious, metallic note, uttered so continuously by sunny day and by moonlight night, extends from Eastern Assam to the Nepal and Sikkim Terai on the West and East to the whole of Burma, the Malay Peninsula to Sumatra and the greater part of Siam. Over most of its range this Barbet is not as common as its Indian confrère, but in Siam it is very common. Wherever found it is a most familiar bird, haunting gardens of houses in towns and villages, breeding in trees therein and in trees by roadsides or in open cultivation, and especially in groves by villages. In regard to its breeding in Siam Herbert writes (Journ. Siam Nat. Hist. Soc. vol. vi, p. 299, 1924):—"The nesting-hole is very similar to that of a Woodpecker, but is always in a dead tree. The favourite position is a nearly perpendicular branch, of probably not more than 4 inches diameter, of a dead "Thong-long" tree in the fruit-gardens. The entrance is on the lower inclined side and therefore free from the drip of driving rain. It is not unusual to find two or more holes, within a few inches of one another, the others being only partially finished, although occasionally two pairs may be found nesting in the same branch. A dead Betel-palm is sometimes used, but in that case there will probably be one hole.

"The birds are not in any way shy, and may be watched at their work as they vigorously cut out chips with their stout heavy bills. When one is working in the inside, the other will be at the entrance, disposing of the chips as they are thrown up, and after about five minutes' work the birds will change places. No lining of any sort is used inside the nesting-hole, and the measurements are: $1\frac{1}{2}$ inches diameter of the entrance-hole; $2\frac{1}{2}$ diameter of the nesting-hole,

with an over-all depth of 5 to 6 inches. Occasionally a hole in a Betel-palm is taken possession of by a Magpie-Robin, but in that case it will be lined with the stems of the dead leaves from the Betel-vines. Another occupant that may be found in a nesting-hole is the Tree-Shrew. I opened several nesting-holes which had young in them, but after repairing the damage I found the parent birds returned again to feed the young. February is the best time for eggs, and nests may also be found in March and April.

"Two eggs are laid and sometimes three."

In Assam I found eggs from February to May, while in Eastern Bengal most birds lay between the end of February and the end of April, a few laying in May.

The eggs are generally long-oval shaped, sometimes very long and rarely short. They are always blunt at the small end.

Fifty eggs average 25.4×17.6 mm.: maxima 28.9×18.0 and 28.0×19.0 mm.; minima 23.2×17.5 and 27.6×16.5 mm.

(1447) *Xantholaema hæmacephala lutea* (Lesson).

THE INDIAN CRIMSON-BREADED BARBET.

Xantholaema hæmacephala lutea, Fauna B. I., Birds, 2nd ed. vol. iv, p. 128.

The Coppersmith is found over the whole of India with the exception of the extreme North-East in Eastern Bengal and Assam. It is common in Ceylon, except in the wettest areas, but is rare in Sind and the driest areas in the Punjab and Rajputana.

This is one of the most common and best known of our Indian birds, breeding in almost every town and village as well as everywhere else where there are signs of cultivation and civilization. It is *not* a forest bird, but on rare occasions has been found breeding on the outskirts of thin Sâl (*Shorea robusta*) forest. It ascends the hills of Southern India to about 2,000 feet, and in Travancore, according to Bourdillon, to about 1,500 feet, but in the Himalayas hardly reaches even these elevations.

The birds seem to have no preference in regard to the tree selected for nesting purposes, though, perhaps, more holes are bored in Mango-trees growing in orchards than in any other. Most nest-holes are drilled in horizontal branches, the entrance being on the under-side, but many are built in vertical branches and in the trunk itself. Always, I think, partially rotten trees are selected which, though the outside is hard and green, has a decayed core. The birds cut a tiny entrance, sometimes little more than 1 inch in diameter, for 2 or 3 inches into the soft interior wood. The tunnel then turns at right angles down the branch or trunk. Sometimes, if the wood is not too rotten, a neat well-smoothed little chamber,

3 inches or so in diameter, is cut out immediately under the entrance but, at other times, when the core is very rotten or there is a natural hollow, the eggs may be deposited 2 or even 3 feet from the entrance. In these cases a new entrance is often added nearer the eggs.

Often an upright stump is chosen for nesting purposes, even when they are completely in the open, while Jerdon and McMaster both record birds making their nest-holes in cross-beams in vineries, while Coltart had one made in a semi-rotten verandah beam.

The breeding season is from February to April, but eggs may be taken almost any month of the year. Many birds breed in January and eggs have been taken in that month in Bihar (Coltart and Inglis); in Poona (Betham); in Deesa (Butler); and in the Central Provinces (Blewitt). On the other hand, second broods are often raised after the Rains break in June and July, and eggs have also been taken in September. Three eggs are generally laid, sometimes only two and rarely four.

In shape they are long, sometimes rather elliptical, ovals, quite blunt at the smaller end.

Fifty eggs average 25.0×17.7 mm.; maxima 28.0×17.0 and 27.9×18.9 mm.; minima 23.0×17.2 and 24.6×15.9 mm.

Both birds work on the excavation. When the entrance is being cut out they work alternately for from five to ten minutes at a time but, when the interior excavation starts, one bird works inside and the other receives and throws away the chips from the entrance, male and female taking turns at the harder interior work.

Both male and female incubate, but the female does most of the day work, while at night both birds frequently sleep in the nest-hole.

The nest-hole is often occupied for many years in succession, though it is constantly deepened and fresh entrances are drilled nearer the eggs each year.

Several writers speak of two pairs of birds breeding in the same branch of a tree, probably in most instances because one of a pair is seen to enter or leave by one hole while the other bird uses another hole. Butler, however, actually took a clutch of eggs and a brood of young within a foot of one another in the same branch.

They sit very close, and will often allow themselves to be moved by hand from the eggs, pecking vigorously and unpleasantly hard all the time.

(1448) *Xantholæma malabarica* (Blyth).

THE CRIMSON-THROATED BARBET.

Xantholæma malabarica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 129.

This Barbet occurs in South-West India, from Ratnagiri to South Mysore. Packard found it breeding in small numbers in February in the foot-hills of the Nilgiris near Malaparam, while Bourdillon obtained two eggs early in March in Travancore at an elevation of about 500 feet. Davidson and Bell took eggs in February and March in Kanara, and I have had eggs sent me from the Malabar coast.

The breeding habits of this bird differ in no way from those of the Coppersmith, but two eggs seems to be the normal clutch and three exceptional.

Ten eggs, all I have been able to measure, average 24.7×17.7 mm. : maxima 26.4×18.8 mm. ; minima 23.0×17.8 mm.

(1449) *Xantholæma rubricapilla* (Gmelin).

THE SMALL CEYLON BARBET.

Xantholæma rubricapilla, Fauna B. I., Birds, 2nd ed. vol. iv, p. 130.

This Barbet is found only in Ceylon.

There is practically nothing on record about its breeding. Wait says ('Birds of Ceylon,' 2nd ed. p. 168):—"It replaces the last species in the damp parts of the low-country, where it is commonest, and is found in the hills up to about 4,000 feet. Like the last species, it is common in gardens and compounds. The breeding season is March to June. The nest is the usual, small round hole in the dead branch of a living tree."

W. Jenkins got me a small series of the eggs, in clutches of two or three, all taken during January and February, the nesting-holes all being drilled in very rotten Cocoa-nut palms. Several nests were found in dead palms too far decayed to climb and, when these were cut down, the eggs were in every instance smashed. The entrance to the nest-holes varied from 6 feet to 30 feet from the ground, mostly over 20 feet. A clutch taken by Lazarus on Slave Island had been laid in a hole in a Bread-fruit tree about 10 feet from the ground.

Ten eggs average 25.1×18.1 mm. : maxima 28.0×19.0 mm. ; minima 24.3×18.8 and 24.4×16.6 mm. It is almost certain that a larger series of eggs would give a decidedly smaller average, as the above seems to be very big in comparison with the bird.

Suborder CUCULI.

Family CUCULIDÆ.

(CUCKOOS.)

Subfamily CUCULINÆ.

(TRUE CUCKOOS.)

The Subfamily *Cuculinæ* contains those Indian Cuckoos which are parasitic on other birds, laying their eggs in their nests and trusting to them to hatch and rear the young ones.

In a work of the scope of the present one it is obvious that it would be impossible to deal fully with the breeding habits of the Cuckoos and the many questions in connection therewith which are yet unanswered. Nor would it be possible to consider the many and contradictory theories which have been suggested in regard to the origin of parasitism, its evolution, and its results.

In this volume the author confines himself to the simplest and easiest of facts which may assist to some extent in identification of the Cuckoos' eggs and will enumerate the principal fosterers in the nests of which the eggs may be found.

At a future date, if the author lives long enough, he hopes to write another work, solely on parasitic Cuckoos, in which he can deal more fully with this very fascinating subject and, to the best of his ability, discuss the various theories and review the evidence for and against them.

The non-parasitic Cuckoos will be dealt with in the same manner as all other birds.

Cuculus canorus.

THE CUCKOO.

(1452) *Cuculus canorus telephonus* Heine.

THE ASIATIC CUCKOO.

Cuculus canorus telephonus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 136.

Within Indian limits the Asiatic Cuckoo breeds over the whole of the North-Western Himalayas from Afghanistan and Baluchistan, through Nepal, Sikkim and Tibet to the Northern Chinese hills. It probably also breeds throughout the greater part of Central Asia and West Siberia from the Yenesei to Kamschatka.

It is also very likely that it sometimes breeds in the hill-ranges of Southern India, as the male has been heard calling in May and June, too late, one would think, for the caller to be a bird on the move.

Betham found it breeding in the broken country round Mhow; Blanford and others found it during April, May and June between Chota Nagpur and the Godavery: McMaster observed it near Sangur, Khamptee and Chikalda and, finally, Butler believed it bred on Mt. Aboo. Except at Mhow, this Cuckoo has not been proved to breed at any of the above places, so it is quite possible that the males calling were unmated birds or very late migrants.

In the Himalayas it breeds between 7,000 and 12,000 feet in considerable numbers from the end of May to the middle of July, while I have one or two eggs taken at heights nearly 2,000 feet higher still. In different places different fosterers seem to be employed for the purpose of bringing up the young. Round about the Murree Hills, Mussoorie and Kuman the favourites are the Bushchats, *Larivora brunnea* and *Trochalopteryx lineatum*, a beautiful blue egg of the Cuckoo having been evolved to go with their eggs. In Mussoorie the Shrike, *Lanius erythronotus*, is another bird constantly cuckolded, and here also evolution has produced an egg to match, and I have several times had clutches of this bird's eggs sent me with unrecognized Cuckoo's eggs among them. Forktails, Larks, Pipits etc. are also constantly cuckolded, while on the Baluchistan and Afghan frontiers Whitehead took eggs from the nests of Ruby-throats, these eggs also approaching those of the fosterer in colour. Altogether I have known of over fifty species of birds being cuckolded by this Cuckoo, but many of these are undoubtedly chance fosterers only, the cuckoo's eggs agreeing in no single character with those of the foster parent. Rattray, Buchanan and others have sometimes found the eggs of this bird in the nests of some of the small Flycatchers and Warblers in holes so small that the bird, if ever hatched, must eventually have died of suffocation. It was obvious also that in many cases the egg could not possibly have been laid direct into the nest.

It is impossible to describe the colours of the eggs of this Cuckoo in detail. A few eggs are rather like those of the English Cuckoo, of the normal inconspicuous grey or grey-brown mottled type, which agree fairly well with any one of the eggs of Pipits, Wagtails or Reed-Warblers; others are much more reddish than are those of the English or European race, while many are as blue as the eggs of the Scandinavian birds which lay in the nests of Redstarts, Wheatears etc. They are larger eggs than those of the European bird but similar in shape and texture and, like nearly all Cuckoos' eggs, heavier, comparatively, than those of the foster parent. The texture is also more "gritty" than it is in other birds' eggs and, when one has pierced a few of them with needle or pin, it is impossible

to mistake the feeling as it goes in. The yolk is nearly always a pale yellow and often slightly phosphorescent in the dark.

The measurements of one hundred eggs taken at hazard from a huge series average 23.6×18.1 mm.

In their love affairs both sexes seem to be indiscriminate and, where they are numerous, no definite pairing takes place. On the other hand, where they are uncommon a male and female may no doubt remain in company so long as it suits them.

(1453) *Cuculus canorus bakeri* Hartert.

THE KHASIA HILLS CUCKOO.

Cuculus canorus bakeri, Fauna B. I., Birds, 2nd ed, vol. iv, p. 130.

This is a more or less sedentary race of the European Cuckoo, first recorded from the Khasia Hills, where, literally, it swarms. Thence it extends throughout the Burmese hills to the Shan States and Karenni. South it occurs in the Pegu Yomas and East it extends to Yunnan. It is a bird of comparatively low elevations. In Assam it breeds principally between 4,000 and 6,000 feet, and I have seldom found it below the former. In Burma and the Shan States it, however, often breeds considerably lower, and many eggs have been taken at 3,000 feet.

I have seen several thousand eggs of this Cuckoo, and it is undoubtedly the species, or subspecies, on which one can most easily base and thus prove or disprove one's theories. For the present I content myself with repeating the information given in the 'Fauna.'

The principal fosterers over a great part of the range of this Cuckoo are birds of the genera *Cisticola* and *Suya* and, in the Khasia Hills, nine Cuckoo's eggs out of every ten, perhaps even a greater proportion than this, are deposited in the nests of these little birds. Both genera make small fragile nests of grass, domed, with a small entrance on one side and generally built on slender grasses. No Cuckoo could deposit its eggs in these nests in the normal manner, and the young Cuckoo, when hatched, distends the nest as it grows, until it either bursts or the grasses break under the weight and it falls to the ground. Normal Cuckoo's eggs deposited in these nests agree fairly well with those of the fosterers except in size. Intermediate eggs are common, which are less like the eggs of either species but which yet agree with slightly aberrant types of one or the other fosterer. In the Northern Burmese hills the favourite fosterers are the various Chats, and here a blue egg of the Cuckoo's is constantly found in the nest of *Oreicola ferrea haringtoni*, which also lays blue eggs. Many Cuckoos also are parasitic on birds of the genera *Monticola* (*Petrophila*), *Nillava*, *Muscisylvia* etc., all of which lay more or less salmon-coloured eggs, and we find that the Cuckoo's eggs are very similar to these.

In the Khasia Hills I have taken many blue eggs of Cuckoos from the nests of *Leiothrix* and *Mesia*, both of which genera lay blue eggs boldly marked with spots of deep reddish. Eggs may occasionally be placed in the nests of almost any kind of bird in almost any kind of position. Thus I have found eggs twice in the nests of the tiny Warbler *Abrornis* placed in small upright bamboos with an entrance nothing like an inch in diameter, the bamboos so small that the young Cuckoo when hatched could not have survived many days.

The period of incubation seems to vary greatly. A nest of *Cisticola cursitans* which contained three eggs on the 10th May when visited on the evening of the 27th had three Warbler chicks and a young Cuckoo just emerging from the shell. Another egg laid in a Pipit's nest on the 14th May did not hatch until the 28th of that month.

Cuckoos have very definite breeding areas, often very restricted in size, sometimes of great extent, but they certainly leave these and continue laying elsewhere when the foster possibilities of the first are exhausted.

The breeding season commences in the middle or end of April and continues throughout May and June, and in lessening numbers in July, a few birds even laying as late as August.

As regards the number of eggs laid by an individual Cuckoo, I have taken seventeen eggs of the same Cuckoo in one season (1932) and another series of fifteen and several of about twelve but, of course, one cannot guarantee that every egg has been found.

Three hundred eggs average 24.2×17.9 mm.: maxima 26.9×18.3 and 25.4×19.3 mm.; minima 21.0×17.1 and 22.4×16.2 mm.

The almost invariable shape is a broad blunt oval and the texture is similar to that of the egg of the European Cuckoo.

***Cuculus optatus*.**

THE HIMALAYAN CUCKOO.

(1454) *Cuculus optatus optatus* Gould.

THE HIMALAYAN CUCKOO.

Cuculus optatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 140.

As some rather doubtful races of this Cuckoo have been separated our form is now given a trinomial. The typical form is a breeding bird within Indian limits from the Afghan and Baluchistan frontiers to the extreme East of Assam and Burma. It breeds at all elevations from 5,000 to 10,000 feet, and probably higher than this in its Western range. Outside our limits this or some other form of *optatus* breeds over the greater part of Central Asia, Siberia and its mountain ranges of Northern China.

The Himalayan Cuckoo normally lays, or deposits, its eggs in the nests of the various Warblers which lay pure white or spotted white eggs, such as those of the genera *Phylloscopus* and *Acanthopneuste*, which birds form practically the sole fosterers in the North-West Himalayas. In the Eastern Himalayas, where *Phylloscopi* are scarce, *Acanthopneuste trochiloides harterti* is the favourite fosterer when available, but many Cuckoos are parasitic on the genus *Cryptolopha*, which make little ball-nests of moss and lay pure white eggs.

Rattray has obtained more than one oviduct egg of this Cuckoo, and Brooks also took an egg from the oviduct of a female he shot at Ruttun Pir in Kashmir on the 17th June. This latter egg is described by Hume as "pure white, with a slight gloss. The markings, which are everywhere very scarce, are somewhat more numerous towards the larger end, and consist of minute specks and tiny lines, not more than 0.05 of an inch in length, of dingy olive-brown and very pale inky-purple or purplish grey." This description would answer equally well for Rattray's oviduct eggs except that in the eggs found by him the tiny specks appeared to be black. Some sixty eggs in my own collection, also, all agree. In some the markings are practically absent, while in a few they are rather more numerous though never in any way dense.

Two exceptions to the above description are two eggs, one with a faintly green-tinted ground found in the nest of a Forktail and another with an equally faint pinkish tinge taken from the nest of a Tailor-bird.

In shape the eggs are long ellipses and the texture is much less coarse than in the eggs of the Common Cuckoo, though the same gritty feeling is experienced in piercing the shell. The eggs are heavy for their size but not exceptionally so.

In China it is possible other types of eggs are laid as Messrs. Ricketts, Styant and La Touche have taken eggs they believe to be those of this Cuckoo from the nests of *Saxicola torquata* and *Pycnorhis sinensis*. These eggs are very like those of their foster parents. The first has a pale grey-blue ground flecked with red, while the second has the ground reddish, densely blotched with darker reddish. A third type taken in the nest of a *Cryptolopha* is like the Indian eggs of this Cuckoo. In size and shape all agree well with the eggs laid in the Himalayas.

The principal breeding months are May and June.

Forty eggs average about 21.0×13.6 mm.: maxima 25.4×15.4 mm.; minima 19.7×13.0 mm.

I have no information as to the period required for incubation, but it must of necessity be even less than that of the Common Cuckoo, or the foster parents' eggs would be hatched too soon and the young grow too big for the young Cuckoo to be able to eject them from the nest.

Cuculus poliocephalus.

THE SMALL CUCKOO.

(1455) **Cuculus poliocephalus poliocephalus** Lath.

THE HIMALAYAN SMALL CUCKOO.

Cuculus poliocephalus poliocephalus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 142.

This little Cuckoo breeds from Gilgit and the Afghan frontier throughout the Himalayas to Eastern Assam, both North and South of the Brahmapootra. Thence it extends to all the Burmese hills, but further South it is replaced by *C. p. lepidus* Vieillot. It also breeds all through the mountains of Central Asia and China to Japan, where it is very common.

Over most of its range this Cuckoo breeds from about 5,000 feet up to at least 10,000 feet, but in Assam I have taken its eggs occasionally at about 3,500 and it is common at 4,000 feet.

Oviduct eggs of this species have been taken, but for which it would be difficult to believe that the two known types were laid by the same species. In Japan, the extreme Eastern limit of its range, the eggs are invariably deep terra-cotta red, varying very little in depth of colour. These eggs are always deposited in the nests of *Cettia*, the eggs of which, except for being more glossy, are practically identical in colour with those of the Cuckoo. Owston, who worked for many years in Japan, told me he had never seen or even heard of the Cuckoo ever placing the egg in any other nest. Since his death, however, eggs have been supplied to some collectors together with other alleged fosterer's eggs.

In the extreme Western Himalayas the egg laid by this Cuckoo is almost always white, absolutely unspotted. This is generally placed in the nests of *Phylloscopi*, but also sometimes in the nests of *Pnoepyga*, *Drymochares cruralis* etc. In Eastern India, Assam to Garhwal, the terra-cotta egg is the more common, this being placed in the nests of different species of *Horornis*, which birds also lay chocolate eggs similar to but darker than those of the Cuckoo. Over most of the central area, however, white and terra-cotta eggs may be found in the same place, though in most cases suitable fosterers are selected.

In shape the eggs are short elliptical, sometimes quite broad, this more especially in the terra-cotta eggs. The texture is about the same as it is in the eggs of *C. optatus*, from which it is sometimes difficult to distinguish the white eggs.

Thirty eggs average 21.0×14.2 mm. : maxima 23.0×15.5 mm. ; minima 19.5×13.5 mm.

They breed throughout May and June and, in the higher levels, all through July.

Cuculus micropterus.**THE INDIAN CUCKOO.**(1456) **Cuculus micropterus micropterus** Gould.**THE INDIAN CUCKOO.***Cuculus micropterus micropterus*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 144.

Although this Cuckoo, with its well known call "bo-kottā-ko," is known to everyone all over India, and undoubtedly breeds almost everywhere from Ceylon to 5,000 or 7,000 feet in the Himalayas and again outside India all through Northern China to Japan, practically nothing is known about its breeding.

Two oviduct eggs are known, both fragments only. The first is one taken by La Touche in China, which is described as being pinkish-white, marked with rich red and carmine, very like some eggs of the *Dicruridae*. The other egg is one obtained from the oviduct of a female shot by Stewart in Travancore, which is all blue, of a rather grey shade. There is also an egg obtained by a collector for Capt. R. E. Skinner. The Cuckoo was seen sitting in a nest of the *Paradise Flycatcher*. The man watched the Cuckoo until it flew off, and then on inspecting the nest found it contained two eggs of the *Flycatcher* and a blue egg, presumably that of the Cuckoo. Finally Rattray took several blue eggs of Cuckoos, which he attributed to this species, in the Murree Galls. These were deposited in the nests of *Trochalopteryx lineatum*, *Hodgsonius phoenicuroides*, *Larvivora brunnea* and *Saxicola torquata indica*, all of which birds lay blue or bluish eggs. They are probably correctly identified as those of the present bird, but in appearance are not distinguishable from those of the common Cuckoo.

Twenty-four of these eggs average 23.7×18.1 mm.; maxima 26.0×19.0 and 25.1×20.0 mm.; minima 22.8×17.9 and 23.0×17.0 mm.

Rattray's eggs were taken in late May and June, but in the plains of India it commences to call in early April and must lay much earlier than it does in the hills. Possibly its normal egg will be found to so closely resemble the eggs of its foster parent that it is impossible to distinguish it by a casual examination.

(1457) **Hierococcyx sparveroides** Vigors.**THE LARGE HAWK-CUCKOO.***Hierococcyx sparveroides*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 146.

The Large Hawk-Cuckoo is found in the Outer Himalayas from Kumaon to Eastern Assam at all heights between 2,500 and 9,000 feet, but breeds most often between 4,000 and 6,000 feet in the Western

Himalayas and between 3,000 and 5,000 feet in the Eastern ranges. Outside India it extends through the Burmese hill-ranges into the Shan States, Yunnan and Eastern China.

This is another Cuckoo the eggs of which have been evolved to suit two different types of fosterer. Rattray, who was the first to take an egg, found it in the nest of the Himalayan Whistling Thrush, and then later others in the nests of *Trochalopteron lineatum*. A. E. Osmaston found several in the nests of *T. erythrocephalum*, all these being in the Western Himalayas. The eggs are pale blue and closely resemble those of the foster parents. In the Burmese hills Cook, Hopwood, Harington and Mackenzie have taken a great many blue eggs of this Cuckoo in the nests of various species of the genera *Garrulax* and *Dryonastes*, with many of which they also agree very closely.

In North Cachar and the Khasia Hills many of these Cuckoos deposit their eggs in the nests of the Great Spider-Hunter. This bird lays eggs of different shades of dark brown, and the egg of the Cuckoo exactly matches these in shape and colour, though they are much bigger.

In these two types of the eggs of *Hierococcyx* we have the only example I know of in which the two different types of egg vary in size as well as in colour. The blue eggs, which are deposited with the larger eggs of *Garrulax*, *Myiophonus* etc., average about 30.1×21.9 mm., while the brown eggs, which one finds with the brown eggs of the Spider-Hunter, average only 26.0×18.9 mm.

In the Western Himalayas the eggs have been taken between June 15th and the end of July, in Burma from early April to the end of June, and in Assam in the Spider-Hunters' nests during these same months.

The long and interesting account of this bird's nesting in the Nilgiris given by Miss Cockburn is of course all wrong, native servants evidently having shot a Cuckoo near a nest of the Bezra Sparrow-Hawk. The white egg sent by Davison to Hume, and recorded by him, is also the egg of a Roller and not that of a Cuckoo at all.

Hodgson's notes, so far as they go, are correct, and confirm modern reports of this Cuckoo laying its eggs in the nests of *Trochalopteron*, *Garrulax* etc.

(1458) *Hierococcyx varius* Vahl.

THE COMMON HAWK-CUCKOO.

Hierococcyx varius, Fauna B. I., Birds, 2nd ed. vol. iv, p. 148.

This Hawk-Cuckoo is found over the whole of Ceylon and India except Sind and the Punjab, its Eastern limits being Kamrup and Goalpara in Assam.

Many oviduct eggs of this Cuckoo have been obtained, the first by Bingham, then by Inglis and Lindsey-Harvey and later by myself.

It deposits its eggs in the nests of different species of *Argya* and *Turdoides* in the plains but, when it wanders above its normal habitat in the plains, as in the hills of Assam, it makes use of the nests of birds of the genus *Garrulax*. The eggs of the Cuckoo being a bright deep blue, well glossed, almost exactly match those of *Turdoides* in colour as in shape, but average bigger, are of much stouter texture and much heavier. It is smaller of course, darker in colour and different in shape to those of *Garrulax*, but still resembles them fairly well also. Occasionally eggs may be found in the nests of other fosterers such as the Bulbuls, *Pycnorhis* and the Fairy Blue-bird (Stewart). Several Cuckoos' eggs may be found in the same nest, and I have two sets of six Cuckoos' eggs found in nests of *Turdoides*. In these instances only one Cuckoo survives, the remainder being eliminated by degrees until only the strougest remains.

As noted above, the eggs are the same deep blue as those of *Turdoides*, equally smooth but a trifle less glossed and much more easily stained, these stains being often the first thing to attract one's attention to the fact that a Cuckoo's egg is present.

The eggs average about 26.0×20.0 mm., but vary very greatly in size; on the whole they are more elliptical and not quite so spherical as the eggs of *Clamator jacobinus*, from which it is difficult to distinguish them.

In South-West India and Northern Central India most birds breed in May and June and in late April, but in Bihar and Bengal many birds lay in March. In the hills they breed almost entirely in May and June, when *Garrulax moniliger* is also busy breeding.

Hierococcyx fugax (Horsf.).

THE JAVAN HAWK-CUCKOO.

(1460) Hierococcyx fugax nasicolor (Blyth).

THE NEPAL HAWK-CUCKOO.

Hierococcyx fugax nasicolor, Fauna B. I., Birds, 2nd ed. vol. iv, p. 151.

Hodgson's, or the Nepal, Hawk-Cuckoo breeds in the Lower Himalayas from Nepal and Sikkim to Eastern Assam and the hill-tracts of Burma.

An oviduct egg of this Cuckoo was obtained by Mandelli from a female shot by him on the 5th June. Hume describes this egg as "a broad oval, scarcely at all pointed at the small end, and a little obtuse at the broad end. The colour is a uniform olive-brown, and round the large end there is an indistinct ring of a darker shade; the shell is firm and smooth, but there is very little gloss on the egg; it measures 0.89 by 0.64 " ($=22.6 \times 16.3$ mm.).

I have taken many Cuckoos' eggs which agree well with the above in North Cachar and the Khasia Hills, while both Coltart and I took others in Margherita, at all heights between 2,000 and 6,000 feet, while they possibly breed at still higher elevations. We found most of these Cuckoos' eggs deposited in the nests of various Flycatchers, especially *Cyornis* and *Niltava*, and also several in the nests of *Heteroxenicus nepalensis*.

The ground-colour of the eggs varies from pale grey-green, yellowish-stone or pale brown to a rather warm olive or sienna-brown, speckled all over with darker reddish-brown, fairly dense everywhere, but denser and forming a zone round the larger end. In shape they are long ellipses, both ends much alike. The texture is fine with a smooth and often slightly glossy surface, fragile for a Cuckoo's egg, but with the usual gritty shell.

They measure about 22.5×15.4 mm.

The breeding season is very protracted; most birds lay in June, but eggs may be found from about the middle of May to the end of July, while I have heard the call up to the end of August and have taken a fresh egg as late as the 14th September.

***Cacomantis merulinus* (Scop.).**

THE PLAINTIVE CUCKOO.

(1462) *Cacomantis merulinus passerinus* (Vahl).

THE INDIAN PLAINTIVE CUCKOO.

Cacomantis merulinus passerinus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 154.

This Plaintive Cuckoo is found practically throughout the better wooded, more humid parts of India, occurring both in the plains and the hills. In the drier parts of the Punjab and North-Western Provinces, Sind and Rajputana it is not found, but it is extremely common round about Hyderabad in the Deccan.

It is a breeding visitor to the Himalayas up to about 8,000 feet and to all heights in the hills of Southern India.

I can add little to my summary of the breeding of this Cuckoo given in the 'Fauna.' I there wrote:—"In the Nilgiris this little Cuckoo breeds in August, September and October, placing its eggs in the nests of *Prinia inornata jerdoni* and laying eggs very similar to those of that bird but larger, paler and more feebly marked. In Lucknow their eggs were brought to Adams in September with the same fosterer. In Kanara Bell and Davidson took numerous eggs in the nests of *Cisticola* and *Orthotomus* in July and August. These eggs had a pale blue or white ground, with light reddish blotches and agree well with the white or blue eggs of the Warblers.

Eggs resembling these have been sent to me from Dehra Dun, the United Provinces and Poona, but from Hyderabad I have had a wonderful series of eggs from Professor Burnet, Col. Sparrow and others which are most extraordinary examples of adaptive selection. In this quite small area the Cuckoo has deserted its ordinary foster parents and is parasitic almost entirely on *Prinia socialis*, a Warbler which lays very bright chestnut-red eggs, and we find that a bright pink-red egg has been evolved to go with that of this Warbler."

In shape all the eggs are alike, long narrow ovals, with one end appreciably smaller than the other; the texture is fine, the surface slightly glossed and the shell stouter and heavier than in passerine eggs of the same size. They average roughly 19.9×14.0 mm.

(1463) *Cacomantis merulinus querulus* Heine.

THE BURMESE PLAINTIVE CUCKOO.

Cacomantis merulinus querulus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 156.

This race takes the place of the preceding form in the East of Bengal and Assam, thence extending over the whole of Burma to the Northern Malay States. It also occurs and breeds in great numbers in the Shan States and extends to Yunnan, Annam, Cochin China, South China and Siam. It is found in the foot-hills, plains and up to an elevation of some 6,000 feet, but is probably most numerous between 2,000 and 5,000 feet.

In the Khasia Hills this little Cuckoo is very common, depositing its eggs in the nests of the still more common *Cisticola cursitans* or the equally common Brown Hill-Warbler. After these two the birds most frequently cuckolded are the Tailor-birds and species of *Franklinia*. In Burma, however, Fielden obtained the eggs in the Tailor-birds' nests only, and in Hong Kong this latter bird was practically the sole foster parent, Jones taking many eggs of this Cuckoo in their nests.

In ground-colour the eggs vary from pure white to pale blue as in the eggs of *C. m. passerinus* and they are marked in the same way as those of that race. In fact the eggs vary in almost the same degree, both in ground and marking, as do the fosterers', and I am sure that at first I overlooked many Cuckoo's eggs in the nests of *Suya khasiana* and *Suya crinigera*. As a rule the eggs are more smearingly blotched than are those of the Hill-Warbler, and often their larger size at once betrays them.

Thirty eggs taken at random from some hundreds average about 19.8×13.8 mm.

They breed from early April to the end of June and in almost equal number in July, while I have taken many *Suya* nests in August with Cuckoos' eggs in them.

Penthoceryx sonneratii*.*THE BANDED BAY CUCKOO.**(1464) ***Penthoceryx sonneratii sonneratii* (Lath.).****THE INDIAN BANDED BAY CUCKOO.***Penthoceryx sonneratii sonneratii*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 157.

This is a Cuckoo of damp areas though found over practically the whole of India and Burma. In the latter country it occurs as far South as Tenasserim. It is common in Malabar and Travancore and also very common in the hills of Assam, more especially South of the Brahmapootra. In the drier areas it is rare or absent.

An oviduct egg of this species was obtained by Mr. J. A. Kemp which is a broad oval in shape, the ground-colour a pale dull lilac, the whole surface with rufous-pink spots scattered profusely all over it. Davidson showed me another oviduct egg, taken, I believe, by Bell, which is very similar but much browner. Other eggs like this one and undoubtedly of this Cuckoo were taken in the Bombay Presidency by Bell, Davidson and others in the nests of *Iora*, *Dumetia* and *Otocompsa*. In the Surma Valley hills I have taken many eggs which can only be those of the Banded Cuckoo and which in many cases are just like the oviduct eggs. These I found in the nests of various Bulbuls, *Tribura* (often), *Stachyridopsis*, *Malaccincla*, *Urocichla* etc. In the Khasia Hills birds of the genus *Alcippe* were regularly cuckolded and, though I cannot be absolutely sure, I have little doubt that the Cuckoo was of this species.

Many eggs are exactly like the oviduct ones above described, but they vary greatly. Some eggs are pure white speckled with deep purple-brown, deep lilac or pink; others are minutely freckled all over with dull neutral tint or reddish-brown. Other eggs are closely assimilated to certain types of *Alcippe* eggs and, when type is laid with type, the resemblance is often extraordinary, though the texture is coarser and heavier, while at other times the contrast is striking.

The eggs average roughly 19.3×15.8 mm., the shape being generally a broad obtuse oval.

In the Bombay Presidency Davidson and Bell took eggs in February and March and the former again in August, while Kemp obtained his oviduct egg in June. In Assam, though May and June are the principal breeding months, the season is a long one, and I have taken eggs from April to August.

(1467) *Chalcites xanthorhynchus* (Horsf.).

THE VIOLET CUCKOO.

Chalcites xanthorhynchus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 160.

This beautiful little Cuckoo occurs in Eastern Bengal, Assam, Nicobars and Andamans, Malay Peninsula to Palawan and the Philippines. Siam.

So far as I know, no oviduct egg of this species has ever been obtained, but Inglis, Primrose, Hole, Coltart and myself have taken many eggs which are exactly like those laid by the Emerald Cuckoo, but which have been taken in ravines and other areas in which no Emerald Cuckoo was found and only the present species seen. I have no doubt that the identification of these eggs is correct. Most eggs were taken in the foot-hills between the plains and 2,000 feet, but the Violet Cuckoo is not rare up to 5,000 feet and I obtained eggs up to this height in the nests of Sun-birds built in Orange-groves. Most of the eggs taken by myself were in the nests of the Little Spider-Hunter, the eggs of the Cuckoo agreeing well with those of the foster parent, though the ring of specks at the larger end is more brown than pinkish-red, the ground varying, as in the eggs of *Arachnothera*, from white to very pale pink. At lower levels the common fosterer is the Sunbird, *Ethopyga s. seheriae*, and here again the eggs of the Sunbird and those of the Cuckoo are much alike, though the latter are much bigger. The ground in these is white, smudgily blotched with light brown or reddish-brown. I have also taken eggs from the nests of *Piprisoma* and *Cisticola*, but these are, I think, abnormal fosterers.

The average of seven eggs is 17.2×12.5 mm. : maxima 17.9×13.3 mm. ; minima 17.2×12.5 mm.

The breeding season lasts from mid-April to the end of June.

Chalcites maculatus.

THE EMERALD CUCKOO.

(1468) *Chalcites maculatus maculatus* (Gmelin).

THE EMERALD CUCKOO.

Chalcites maculatus maculatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 162.

The Emerald Cuckoo is found from Kuman to Eastern Assam in the Himalayas from the foot-hills up to 5,000 feet but generally below 3,000 feet. It is common over the hill-country of Burma and the Indo-Chinese countries to Hainan, while it has been recorded from Yunnan and as far East as the Yangtse. Within this area it is not found, or only rarely, in the most dry zones such as Central Pegu, for it is essentially a bird of damp forests.

Primrose found eggs of a Cuckoo deposited in the nests of *Ethopyga siparaja seheriae* in ravines in deep forest in Goalpara. One

of these eggs he left in the nest to be hatched, and when it was nearly ready to fly took it and sent it to me to confirm his own identification as to it being the Emerald Cuckoo. Primrose and Inglis took several eggs, all from the nests of this Sunbird, and very kindly gave me some. Later I took a few eggs myself, generally from nests of Sunbirds, but also from the nests of the Small Spider-Hunter and from those of *Phylloscopus r. harterti* and *Cisticola*.

The egg cannot be distinguished from that of the Violet Cuckoo but, fortunately, these Cuckoos seem to have very restricted breeding areas and, with time and patience, it is often easy to find out which of the two is haunting and breeding in the ravine or other area in which the eggs have been taken.

Seventeen eggs average 16.9×12.3 mm. : maxima 18.0×12.6 and 16.3×12.8 mm. ; minima 15.3×12.0 and 16.1×11.9 mm.

In shape they are broad obtuse ovals and the texture, though coarse, is very fragile, for a Cuckoo's egg.

The breeding season is from the middle of April to the end of July.

***Surniculus lugubris* (Horsf.).**

THE DRONGO-CUCKOO.

(1469) *Surniculus lugubris brachyurus* Stresemann.

THE MALAY DRONGO-CUCKOO.

Surniculus lugubris brachyurus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 164.

Stresemann restricts this race of the Drongo-Cuckoo to peninsular Burma and Siam and the Malay States.

There is no absolutely authentic egg of this species, but Kuschel, in a letter to me, writes :—" I have secured eggs of this species from the nests of *Henicurus leschenaulti*, *Pycnonotus aurigaster*, *Megalurus palustris* and *Lanius*." An egg sent me, taken in the nest of the first-named bird, has a pale creamy ground with a few faint specks of rusty red thinly scattered all over it. In shape it is a short, broad ellipse, measuring 19.5×14.9 mm., and was taken on the 5th April.

It agrees with the eggs supposed by me to be those of the Ceylon Drongo-Cuckoo.

(1470) *Surniculus lugubris dicruroides* (Hodg.).

THE INDIAN DRONGO-CUCKOO.

Surniculus lugubris dicruroides, Fauna B. I., Birds, 2nd ed. vol. iv, p. 165.

This race of the Drongo-Cuckoo is found in Upper India and Assam, Burma and Siam North of about latitude 10° , Hainan and China.

This Cuckoo breeds throughout its range from April to June, but there is still no certainty about its eggs.

Rattray has seen King-Crows feeding a young Drongo-Cuckoo and has taken an egg from a Drongo's nest which he believes to have been that of this Cuckoo. It is much like that of the Drongos, *i. e.*, a cream ground-colour with blotches and marks of deep red, but it is different in colour to the eggs it was taken with and is different in texture. It measures about 23.5×17.5 and, if really an egg of this Cuckoo, is proportionately much the biggest Cuckoo's egg I have ever seen. An egg taken by Coltart in Assam in the nest of a Forktail is of the same type as that sent me by Kuschel, but is marked with darker brown and grey-brown and is also decidedly bigger, measuring 22.2×15.3 mm. I think this is probably correctly identified, as there was no other Cuckoo about except the suspected parent.

Nehrkorn describes the egg as being just like those of *Cacomantis* and as being deposited in the nest of *Suya crinigera*. There is probably some mistake in regard to this last statement.

(1471) *Surniculus lugubris stewarti* Stuart Baker.

THE CEYLON DRONGO-CUCKOO.

Surniculus lugubris stewarti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 166.

This subspecies is found in Western India from Karwar in the Bombay Presidency to Ceylon.

Here again our evidence, such as it is, about the eggs of this Cuckoo is very contradictory. Davidson and Bell have both seen Drongos feeding young Drongo-Cuckoos, and the latter has taken eggs from Drongos' nests which he believes to have been those of the Cuckoo. He describes the eggs as "the same size as those of *D. ater*, in whose nests they were found, and are similar; the shape is somewhat abnormal, tending to both ends being somewhat obtuse." Though this evidence certainly supports that of Rattray, we again have an egg so large that it is contrary to all we know of Cuckoos' eggs which is really certain.

Wait and Stewart's Ceylon evidence is stronger. First they both find young Cuckoos in the nests of the Black-fronted Babbler, and then they obtain quite a number of eggs in the same kinds of nests. These are in type much more like the supposed eggs of *Surniculus* taken by Coltart and Kuschel. The ground is grey-white and they are sparsely speckled and blotched with brown and underlying marks of neutral tint—in fact the eggs are not unlike those of the foster parent.

Three of these eggs measure 19.3×14.7 , 19.6×14.8 and 19.5×14.6 mm. A fourth egg taken in a nest of an *Iora* measures only 17.5×13.8 mm.

I think it is almost certain that these eggs will prove to be correct.

The breeding season in Ceylon is from December to May and in Travancore January to March.

Clamator jacobinus.**THE PIED CRESTED CUCKOO.****(1472) Clamator jacobinus jacobinus (Bodd.).****THE INDIAN PIED CRESTED CUCKOO.**

Clamator jacobinus jacobinus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 167.

This Cuckoo has a most extraordinary range. It is found all over India and Northern Burma and is also found over a great part of Southern Africa.

Many oviduct eggs of Indian birds have been taken, and all of these are alike, deep blue eggs, generally broad ovals or spheroidal in shape, and almost identically like those of the foster parents, which are invariably species of the genera *Argya* and *Turdoides*. In size they agree well with the eggs of the latter but are, of course, much bigger than the eggs of some species of the former.

It is of course impossible very often to distinguish between the eggs of this Cuckoo and those of *Hierococcyx varius*, but over most of its range the latter breeds in April, May and June and the former in June, July and August. The eggs of the Hawk-Cuckoo are also larger on the average and are more broad elliptical rather than spherical. The yolk of the eggs of *Hierococcyx* is much paler than that of the egg of *Clamator*.

In the hills when this Cuckoo wanders above its normal breeding elevation where no *Argya* or *Turdoides* breeds it then selects the nests of *Garrulax moniliger* or *G. pectoralis* in which to place its egg, and the resemblance between the eggs of fosterer and Cuckoo is then not nearly so complete. Odd eggs have from time to time been found in the nests of queer fosterers such as Bulbuls, Shrikes etc., but these are merely casual instances and do not, I think, mean anything more than that the Cuckoo has not been able to find one of the nests of the proper fosterers.

One hundred eggs average about 23.9×18.6 mm., but vary greatly in size.

(1473) Clamator jacobinus taprobanus Hartert.**THE CEYLON PIED CRESTED CUCKOO.**

Clamator jacobinus taprobanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 169.

This Cuckoo is found only in Ceylon.

The eggs are generally deposited in the nests of *Turdoides griseus striatus*. They are, of course, not to be distinguished from those of the typical subspecies, though they average smaller. The eggs have been found from November to June and again in August.

Wait points out that the white of these Cuckoos' eggs is faintly tinged with green, a character I have also noticed in the eggs of the typical form and in those of *C. coromandus*.

(1474) *Clamator coromandus* (Linn.).

THE RED-WINGED CRESTED CUCKOO.

Clamator coromandus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 170.

This, the largest of all our parasitic Cuckoos, has a rather curious breeding distribution. In the Himalayas it is a common bird from Kumaon and Garhwal to the extreme East of Assam; thence it extends throughout Burma, Malay States, Borneo, the Philippines and Celebes; still further East it occurs in the Indo-Chinese countries, West and Southern China. South of the Himalayas it has been recorded from Chota Nagpore, also rarely from Madras City and Trichinopoly, while on the West it occurs not infrequently on the Malabar coast, Travancore, and is common in Ceylon. It breeds up to about 6,000 feet.

In the Western Himalayas the most common fosterer is *Grammotopila*, and less often the egg is found in the nests of different species of *Trochulopteryx*, while in the Eastern Himalayas most eggs are deposited in the nests of *Garrulax moniliger* and *pectoralis*. At odd times eggs may be found in the nests of almost any of the Laughing-Thrushes, while still more rarely they have been taken from such unlikely nests as those of the Bulbuls and Quaker-Thrushes. In my own experience all such eggs have been deserted, but Fielden saw young Crested Cuckoos being fed by Quaker-Thrushes. Often many Cuckoos' eggs are laid in the same fosterer's nest, their appearance showing that they are deposited by two or even three Cuckoos, so it is obvious that these birds do not have any special breeding territory.

In Assam most birds lay during May and June, but eggs may be found from early April up to the end of August; in Burma April and May are the most popular months, while in Western India the last half of April to the first half of June.

The eggs of the Red-winged Cuckoo are just large editions of those of the Pied bird but perhaps more spherical and slightly paler on an average.

All the blue eggs of Cuckoos seem to take a dark stain from damp which I have never seen on any other egg and, though the spherical blue eggs of the Cuckoo are easy to distinguish from the longer and more pointed eggs of the Laughing-Thrushes, this stain sometimes helps to distinguish abnormally long eggs of the Cuckoo.

Fifty eggs average 26.0×22.8 mm.: maxima 29.9×22.9 and 26.9×24.4 mm.; minima 25.4×21.7 and 26.3×20.3 mm.

Subfamily EUDYNAMINÆ

(KOELS).

Eudynamis scolopaceus.

THE KOEL.

(1475) **Eudynamis scolopaceus scolopaceus** (Linn.).

THE INDIAN KOEL.

Eudynamis scolopaceus scolopaceus, Fauna B. I., Birds, 2nd ed. vol. iv., p. 172.

The Koel, or "the curse of the sick man in India," as it has been called, is found all over India and Ceylon, but is rare in Sind and the Punjab and absent from the North-West Provinces. In Assam its place is taken by the Burmese form.

There is no European one would imagine in India who does not know that this, unfortunately, very common bird lays its eggs in the nests of Crows, generally of the common House-Crow, but often also in that of the Jungle-Crow. Wherever the Crows breed, in the heart of great cities, in villages and cultivated tracts, or in country more remote, there will the Koel also be found in numbers only less numerous than the birds which they cuckold.

Koels certainly have no breeding territory in the usual sense of the word. More than one egg of this Cuckoo is repeatedly found in the same nest. I have myself seen six or seven several times, while as many as thirteen have been recorded. These show quite clearly, by size, shape or tint, that two or three and, in one case, four birds have laid in the same nest in addition to the rightful owner.

The eggs are not unlike Crows' eggs, having a pale stone, pale greenish-yellow, or yellowish-grey ground, profusely marked all over with blotches, freckles, specks and spots of reddish-brown, but giving the prevailing impression of greenish eggs just as those of the Crows appear to be. In shape they are broad ovals, shorter and rounder in comparison with those of the Crows and considerably smaller.

One hundred eggs average 31.0×23.6 mm.

The breeding season varies considerably, generally in accord with that of the Crows they cuckold. Over most of India late May, June and early July form the main breeding season; in Bengal June and July. In Dacca, Mymensingh etc. in Eastern Bengal the Cuckoos have two seasons' laying, first in the nests of the Jungle-Crow in December and January, and then in the end of May when the House-Crows start breeding, the Cuckoos also start again.

In spite of this Cuckoo being so exceedingly common, much yet remains to be learned about its habits. It is still doubtful whether the Koel usually removes an egg of the foster parent when depositing her own in the nest. There is much conflicting evidence on this point but little definite proof one way or the other. Many people have seen young Koels being fed by Crows, yet Hume says that he himself has many times seen adult female Koels feeding young ones of their own species.

Finally it is not known to what extent, if at all, young Koels eject the eggs or young of their foster parents, or the young fight it out among themselves when there is more than one hatched in a nest.

Crows breed in almost every garden in India; their nests are often so placed that they can be closely watched in comfort from window or verandah; Koels lay their eggs in these nests, yet we do not know half as much as we ought about these birds.

In Dibrugarh Crows built in an avenue 100 yards from my house and in Dacca within a few yards of my verandah. All I discovered was that the Koel, at all events sometimes, lays its egg direct into the Crow's nest. Also from watching certain Crows' nests I knew that where one day there have been so many Crows' eggs, the same day later there has been one Crow's egg less and one Koel's egg more, though this was not always the case. I have never seen a young Koel eject either egg or young Crow or brother or sister Koel from the nest. On the other hand, I have seen Koels and young Crows in the same nest and within a few days but one young Koel was left in it. Sometimes also I have seen the remains of eggs and young birds under Crows' nests from which they have evidently been thrown out.

From personal observation also I have been able to ascertain that though Koels may have morals, they are shockingly bad ones. Finally, in over thirty years' residence in India I never saw young Koels being fed by females of their own species.

(1476) *Eudynamis scolopaceus malayana* Cab. & Hein.

THE MALAY KOEL.

Eudynamis scolopaceus malayana, Fauna B. I., Birds, 2nd ed. vol. iv, p. 174.

This subspecies of the Koel extends from Assam throughout Burma to the Malay States and East to the Indo-Chinese countries. In Yunnan and China it is replaced by another very closely allied form, *chinensis*.

This bird has been known frequently to place its egg in the nest of the Chinese Magpie, *Pica pica sericea* and, occasionally, in the nests of some of the *Sturnidae* or Mynas. With this exception there is nothing one can add about its breeding which has not been said about its Indian cousin.

Subfamily PHŒNICOPHAINÆ

(NON-PARASITIC CUCKOOS).

Zanclostomus javanicus Horsf.

THE LESSER RED-BILLED MALKOHA.

(1477) *Zanclostomus javanicus pallidus** Kloss.

THE LESSER RED-BILLED MALKOHA.

Zanclostomus javanicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 175.

This Malkoha is found from Tenasserim to Borneo. It has never been found breeding within our limits, but it must do so wherever found. A nest containing two eggs of this Cuckoo was sent to me by Major Moulton which was taken at Kuching, Borneo, on the 10th March. The nest was described as "a flimsy affair of grass-blades and twigs placed in a thick bush in scrub-jungle. The two eggs are quite typical of the eggs of this subfamily. The inner shell of the eggs of all the Malkohas is white or creamy-white, but this is entirely covered by a calcareous deposit which becomes very smooth and polished yet always porous, and never hard, so that it can always be scraped off with a knife. Very shortly after being laid the eggs become stained with yellowish.

The two eggs are in shape very broad ellipses and measure 29.8×23.8 and 28.5×22.6 mm.

(1478) *Rhopodytes viridirostris* Jerdon.

THE SMALL GREEN-BILLED MALKOHA.

Rhopodytes viridirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 177.

This Malkoha is very common in parts of Ceylon, and extends North of Ceylon, through Travancore, to Belgaum and Ratnagiri on the West and on the East to the Godaverri and Cuttack.

Wait gives a good description of the nest of this bird in Ceylon in a letter to me. He writes :—"They prefer rather scrubby jungle and build at a height from the ground of six to ten feet in thorny bushes. The nest is like a substantial Dove's nest, but the twigs are much more numerous, being piled up to the thickness of an inch. There are always a few green leaves by way of lining. The usual number of eggs appears to be two but I have once found three. The bird sits fairly close, but its courage fails at the last moment

* Robinsou and Kloss have separated the bird occurring in Borneo to Burma under this name, though the differences supposed to exist are almost negligible.

and it flops out of the bush, if you pass within five yards, in an agitated manner, which gives it away at once."

There appears to be no real breeding season for this Cuckoo, as Wait, Phillips and Jenkins have between them taken eggs in every month of the year.

The normal clutch is two or one only, and I have never seen a three.

The eggs are practically spheroidal and in every respect quite typical of the subfamily.

Six eggs average 29.4×24.8 mm.; maxima 29.6×24.0 and 29.5×26.0 mm.; minima 29.0×25.1 and 29.6×24.0 mm.

Rhopodytes tristis.

THE LARGE GREEN-BILLED MALKOHA.

(1479) *Rhopodytes tristis tristis* (Lesson).

THE HIMALAYAN LARGE GREEN-BILLED MALKOHA.

Rhopodytes tristis tristis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 178.

This Green-billed Malkoha frequents the Outer Himalayas from Kuman and Garhwal to Eastern Bengal and Assam. It possibly occurs in Chota Nagpore and the Northern Circars (Jerdon), while East it extends through the Chin Hills to the Southern Shan States.

The Malkohas are birds of the forest, and frequent alike that which is deep evergreen, mixed Bamboo and scrub and thick secondary growth. Very occasionally they may be seen in jungle entirely of clump Bamboo except for a little hush undergrowth. They breed at all heights from the foot-hills up to some 2,500 feet and, above that, less commonly up to 5,000 feet in Assam and Burma and up to 7,000 feet in the Western Himalayas.

Most nests are built on bushes, saplings or brambles in fairly dense evergreen forest, sometimes in thick or thin secondary growth and occasionally in Bamboo-clumps in Bamboo-jungle. When on bushes they may be anything from 4 to 20 feet from the ground but are usually under 10 feet from it. When in Bamboo-clumps they may be placed either resting on a tangle of twigs or right inside the clump, resting on the mass of debris collected therein. The nests I have personally taken from Bamboos have all been 4 or 5 feet from the ground, but one taken for Gammie at Mongpoo, at 3,000 feet elevation, was placed on Bamboo branchlets 8 feet from the ground.

Cripps took three nests in Sylhet, where the bird is common, 4, 12 and 15 feet from the ground, all placed in small trees. Cripps and Gammie both describe the nests as exactly like the great number I have myself taken or seen *in situ*. When first found they strike one as glorified Doves' nests with a lining of green leaves. In shape they are shallow saucers or mere platforms, sometimes built wholly of small twigs, none as thick as a pencil, sometimes of twigs mixed

more or less with coarse roots and grass-blades. The twigs are interwoven to some extent and the nests will stand careful removal but not rough handling. They measure anything from 6 to 10 inches in diameter, sometimes being more oval than round, while in depth they vary from about 2 to 4 inches. The depression is never very deep; in the platform nests it is often barely an inch and, even in the saucer nests, does not exceed 2 inches in depth by 4 or 5 in width.

The nests are not well concealed as a rule and are sometimes quite conspicuous.

The breeding season is a long one and I think some birds have two broods, though I have no actual proof of this. I have seen fresh eggs from the beginning of April to the end of August, May and June being the two months in which most eggs are laid.

The full clutch numbers two, three or four, one number just as often as another.

In texture they are the usual chalky white and in shape vary from short elliptical to rather long ovals.

Fifty eggs average 33.8×25.8 mm.: maxima 36.1×26.9 and 34.1×27.9 mm.; minima 27.8×20.7 mm.

The birds sit fairly close, but always leave with a tremendous flutter when they do go. If the nest is well hidden the sitting bird will sometimes wait until the passer-by is within arm's reach of the nest.

I cannot say if both birds work at the nest; I think so but, as the male and female are not distinguishable in the field and I have never seen both birds at the nest together, I cannot be certain. They are lazy workers and their nests, poor as they are, take anything from five to ten days to complete.

Both birds incubate and we have snared both sexes on their eggs.

(1480) *Rhopodytes tristis longicaudatus* (Gray).

THE MALAY LARGE GREEN-BILLED MALKOHA.

Rhopodytes tristis longicaudatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 179.

This Malkoha is found over the whole of Burma except the Chin Hills in the extreme North-West, South it ranges through the Malay Peninsula and East through the Shan States to Siam.

The breeding haunts, nests and eggs of this race differ in no way from those of the preceding bird, though it is possible that they make use of Bamboo-clumps or bushes, as Oates calls them, more often than does the Indian bird.

The breeding season is even longer than it is in India. Oates obtained eggs from the 10th June to the 10th September in Pegu, all with one or two eggs. Bingham found a nest with three eggs in the Thoungyeen Valley on the 13th March and two others a little later. Hopwood also obtained eggs in March near Tavoy, whilst Cook took eggs from April to July in the Southern Shan

States and in Ataran. The season therefore lasts from early March to the first half of September.

The normal clutch seems to be two or three, four being quite exceptional, though Macdonald obtained one such clutch at Amherst on the 20th May.

Thirty eggs average 33.2×25.7 mm.: maxima 36.0×26.1 and 34.9×27.5 mm.; minima 31.1×25.0 mm.

(1481) *Rhopodytes diardi* (Lesson).

THE SUMATRAN GREEN-BILLED MALKOHA.

Rhopodytes diardi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 180.

Diard's Malkoha, as this bird has hitherto been called, occurs from about the latitude of Mergui in Tenasserim, through the Malay States, to Sumatra.

What little we know of this Malkoha shows it to be a bird of similar habits and similar kind of country to those of the Malkohas already dealt with.

Kellow took several nests, each with two eggs, in early March round about Perak in the Federated Malay States, while Hopwood took one nest, also with two eggs, near Tavoy on the 27th April.

Kellow describes the nests as "very shallow saucers of fine twigs, about six to eight inches in diameter and one to two inches deep. The lining is of green leaves and the nests were built in bushes in scrub and other jungle."

From the above this Malkoha would seem to be an early breeder, but more experience of their nidification might well add greatly to the period of laying.

All the clutches taken were of two eggs only and, as some were much incubated, two may prove to be the full clutch for this Southern bird.

The eight eggs average 31.6×25.2 mm.; maxima 33.6×26.5 mm.; minima 29.0×25.1 and 30.5×23.8 mm.

(1483) *Rhamphococcyx erythrognaethus* (Hartl.).

THE CHESTNUT-BREASTED MALKOHA.

Rhamphococcyx erythrognaethus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 181.

This fine Malkoha has been found as far North as Yea in Tenasserim, from which place it extends South through the Malay States and peninsular Siam to Sumatra.

This bird is resident wherever found, and will therefore eventually be obtained breeding in Tenasserim. At present the only eggs known are three clutches, each of two, taken by Kellow near Sim-pang and Taiping in evergreen forest on the 9th February and the 16th and 24th of March. Kellow merely notes with regard to these eggs:—"Nests very ragged structures or platforms of twigs lined

with leaves and such shallow affairs that it would seem that the eggs must be blown out with a wind. They were built in tall bushes in evergreen forest."

The six eggs average 34.9×26.4 mm. and vary very little in size.

(1484) *Phœnicophaus pyrrhocephalus* (Pennant).

THE RED-FACED MALKOHA.

Phœnicophaus pyrrhocephalus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 182.

The Red-faced Malkoha is confined to Ceylon and to the South of Travancore, where it was obtained by Stewart together with its nests.

In Ceylon Wait says ('Birds of Ceylon,' 2nd ed. p. 217) :—"It may be met with in thick forest and heavy jungle over most of the medium and wet zones. It ascends the southern hill ranges as high as Hapatale. It is a shy bird not uncommon in the wilder stretches of forest but is seldom seen near cultivation. The breeding season appears to be about May."

I have five clutches of this Cuckoo's eggs, containing two or three eggs each. These were taken by Jenkins in January and May and by Stewart in April and May.

The nests are said to be quite typical of the Malkohas. Jenkins describes them as "shallow saucers of grass, roots and twigs very carelessly put together and placed in high bushes in forest with thick undergrowth." One pair of eggs sent by Jenkins are covered with a curious brown stain, thought by Jenkins to be caused by the fresh green leaves which form the lining of the nest, otherwise all the eggs are quite normal.

Twelve eggs average 35.8×27.0 mm. : maxima 36.9×27.3 and 34.8×28.7 mm. ; minima 32.5×28.3 and 33.9×25.3 mm.

In one of his letters Jenkins tells me that he found his nests when the birds floundered out of thick bushes as he was pushing his way through dense undergrowth. The birds soon returned to the nests and he shot one, which he sent me.

Rhinortha chlorophæa.

THE CHESTNUT-BACKED MALKOHA*.

(1485) *Rhinortha chlorophæa chlorophæa* (Raffl.).

THE CHESTNUT-BACKED MALKOHA.

Rhinortha chlorophæa chlorophæa, Fauna B. I., Birds, 2nd ed. vol. iv, p. 184.

This Malkoha ranges from Yea in Tenasserim and Marprit in Siam South through the Malay Peninsula to Sumatra.

* This bird has hitherto been known as Raffles' Green-billed Malkoha. As there are many green-billed birds and only one Chestnut-backed Malkoha, this name seems preferable.

According to Davidson this Cuckoo is found in the densest of evergreen forest, cane-brakes and scrub-jungle, and Robinson says that it ascends the hills not higher than 1,500 feet and does not occur in mangroves.

The only note I have on its nidification is one from Kellow who, however, only says that he "found two nests in thick forest with one egg. The nest was just like those of *Rhopodytes tristis*, but I saw the bird with its unmistakable red back. I send the skin of the bird, which I shot off the nest when it returned." The nest was taken on the 29th March, 1909, and on the 2nd of January two years later a second nest with three eggs and the parent bird were obtained by Kellow and sent to me.

The single egg measures 31.0×25.0 mm. ; the three, 32.8×25.5 , 34.4×26.0 and 36.0×24.9 mm.

Taccocua leschenaulti.

THE SIRKEER.

(1486) *Taccocua leschenaulti leschenaulti* Lesson.

THE SOUTHERN SIRKEER.

Taccocua leschenaulti leschenaulti, Fanna B. I., Birds, 2nd ed. vol. iv, p. 185.

Roughly speaking this Cuckoo may be said to be found South of a line drawn from the Gulf of Cambay to the mouths of the Mahanadi. It also occurs in the South and South-East of Ceylon at the foot of the hills.

All forms of Sirkeer Cuckoos are birds of dense cover. They are found in forest, but prefer thick scrub-jungle, secondary growth, mixed scrub- and Bamboo-jungle, more especially such of these as have a lot of grass tangled in with the other undergrowth.

The nests are like those of the Malkohas and not like those of the Crow-Pheasants, as described by Miss Cockburn in Hume's 'Nests and Eggs.' Like those of the Malkohas it is a large rough platform or shallow saucer made of twigs, often with dead leaves attached to them, while the lining is of green leaves. Sometimes roots, grass and other oddments are mixed with the twigs in the body of the nest. The nests measure anything from 8 to 12 inches across, while the depression for the eggs, never very noticeable, varies from $\frac{1}{2}$ to $1\frac{1}{2}$ inch in depth and about 4 to 6 inches in diameter. The materials are very roughly and untidily put together but are sufficiently well intertwined to stand careful handling.

They may be placed in any kind of bush or small tree at heights between 3 and 20 feet from the ground, but more often under than over 6 feet. Sometimes they are well concealed in dense foliage, sometimes most conspicuously placed in a bare fork of some small sapling.

The breeding season varies considerably. Vidal found a single fresh egg in the Konkan on the 8th April and Miss Cockburn says it breeds in the Nilgiris in March. In Travancore Bourdillon obtained eggs in March and May; in Kanara Davidson took two eggs in June; in Trinulgherry Sparrow three eggs in July; while, finally, Barnes found it breeding in Sangur, Central Provinces, in September.

The full clutch is normally two, though Sparrow obtained a three and other collectors have taken single eggs hard-set.

Twenty eggs average 33.0×26.1 mm. : maxima 35.2×28.4 mm. : minima 33.0×27.2 and 33.1×24.9 mm.

Both sexes incubate. Brooks, writing of one of the other races, says: "At the time the eggs were taken, the female was sitting close to the nest and the male (sitting) so closely that the man had to climb up before it would leave."

(1487) *Taccocua leschenaulti sirkee* (Gray).

THE PUNJAB SIRKEER.

Taccocua leschenaulti sirkee, Fauna B. I., Birds, 2nd ed. vol. iv, p. 187.

North of the range of the preceding bird this race is found in the North-West Province, Punjab, Rajputana, Sind, Central Provinces, and United Provinces.

The nidification is quite typical of the genus in every way.

Blewitt says the breeding season is from June to August, but Bingham found a nest near Delhi on 4th April. This probably was unusual. Jesse took a series of eggs between the 6th and 26th June round Lucknow, Bulkly took them in Sind during June, and Betham took two fresh eggs in Baroda in August.

The normal clutch is two or three, twelve eggs measuring 36.2×27.3 mm. : maxima 38.0×27.8 and 37.3×28.2 mm. ; minima 34.2×27.7 and 34.6×26.1 mm.

(1488) *Taccocua leschenaulti infuscata* Blyth.

THE WESTERN HILLS SIRKEER.

Taccocua leschenaulti infuscata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 187.

This Sirkeer, which was named by Blyth from a specimen from the Sub-Himalayas, occurs from the foot of the hills up to about 7,000 feet in the Outer Himalayas from Mussoorie and Murree, Simla States and Garhwal to Dehra Dun.

This must be the most rare of the various forms of Sirkeer. The only note Hume has on its breeding is one by Brooks, who obtained one nest at Chunar on a small Banian-tree about 15 feet high. The

nest was taken on the 25th May and contained two eggs. In my own collection I have only two eggs, which were taken by E. M. Ollenbach on the 17th June below Mussoorie at about 4,000 feet elevation.

These two eggs measure 35.0×29.0 and 35.1×28.3 mm.

(1489) *Taccocua leschenaulti affinis* Blyth.

THE BENGAL SIRKEER.

Taccocua leschenaulti affinis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 188.

This race of Sirkeer extends from Nepal, Bihar and Bengal to Orissa in the South and to Western Assam on the East.

This is locally much the most common and numerous of all the Sirkeers. It is found in the plains and in the hills up to 8,000 feet, but is more common below 5,000. In Bihar and Western Bengal it is exceptionally common, and many nests have been taken by Inglis, Coltart, Harvey and others in this province. Here the birds not only frequent the same kinds of heavy forest affected by the other forms but are also not rare in the grass *churs* of the rivers and even enter gardens and compounds.

The breeding season is long, from April to July, but is fairly well defined.

The normal clutch of eggs is three but sometimes four are laid and sometimes two only are incubated.

Twenty-eight eggs average 34.8×26.5 mm.; maxima 37.3×27.0 and 36.1×28.1 mm.; minima 29.6×25.0 mm.

Centropus sinensis.

THE CROW-PHEASANT OR COUCAL.

(1490) *Centropus sinensis sinensis* (Stephen).

THE COMMON, OR NORTHERN, CROW-PHEASANT.

Centropus sinensis sinensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 189.

The Common Crow-Pheasant is found over the whole of Northern India from Sind and Kashmir to Eastern Assam. It is the form found throughout the Punjab, North-West Provinces and United Provinces and as far South as the Ganges in Bihar and Bengal.

The haunts and habits of all the Crow-Pheasants are the same and, as with the Malkohas and again with the Sirkeers, one description of these suffices for all of them.

It occurs all over the plains and in the hills up to 7,000 feet, though not often over 5,000 feet, everywhere where there are to be found grass-lands, scrub-jungle or thin secondary growth. It is common and breeds in the wide expanses of grass round villages

in Bengal, Bihar and Assam half-eaten down by buffaloes and cattle and intersected in all directions by tracks, both of cattle and human beings. It seems to love tangled jungle of all kinds other than actual forest, in which it is seldom to be found. It likes, however, jungle with open spaces here and there where it can run about in comfort.

Sometimes it places its nest in dense clumps of grass quite close to the ground, while at other times it may be as many as 20 feet up in small trees. Generally, however, it is placed in low thick bushes, 2 to 4 feet from the ground, and very often in thorny ones. Some nests, instead of being placed inside the dense foliage of bushes and brambles, where they would lie almost completely concealed, are perched on the tops of the bushes, balls of rubbish conspicuous from a great distance. Rarely the nest is situated in high trees, more especially when these are growing in scrub-jungle. Blewitt says "I have found it high up on tamarind and other trees, fully exposed to view"; Butler found one nest on a creeper growing over a tree, 18 feet from the ground, and Inglis has taken a nest from high up in a Mango-tree in a Mango-orchard. The latter gentleman also had a pair of these birds breed in a Bougain-villia-hedge in his garden. On the other hand, Marshall (G. F. L.) says that their favourite sites for nests round Cawnpore are "thick tufts of surkerry-grass about 3 feet from the ground," while Bingham took one nest from an Aloe-hedge not 6 inches from it.

The great majority of their nests are domed. Hume says that of fifty nests seen by him all were domed without exception, while of as many seen by me only two were not domed.

Generally the nest is a very roughly made loose ball, measuring anything up to 18 by 12 inches. Some are higher than wide, some broader than high, while others are like large Rugby footballs lying on their sides. The entrance is about the middle of one side, large and very carelessly finished off, and measuring 4 to 6 inches in diameter.

In a few cases the nest is not domed. Blewitt says that of six nests found by him four were not domed and were "simply nests about the size of very large round plates, with a depression in the centre for the eggs." The only two open nests I have come across myself were both deep cups with the sides well raised, leaving a cavity for the eggs about 7 inches across by nearly as much in depth.

Nearly all the nests I have seen have been made of broad leaves taken from ekra or similar broad-bladed kinds of reed or grass; many have bamboo-leaves mixed with these and a few have had twigs and leaves, or twigs with leaves, worked into the sides and bottom. Often, however, the whole nest is made of twigs, sometimes stripped, sometimes with the dead leaves still adhering. Butler found nests made entirely of dead twigs and lined with strips of green plantain-leaves and mulberry-leaves. When the nest is made of grass and rush-leaves no definite lining is made of other

materials but, when made of twigs and placed in Mango-trees, Inglis says that the lining is nearly always of green Mango-leaves.

Hume gives the breeding season as from the 1st June to the 5th September. This agrees with what is recorded by other collectors. Inglis took eggs from the 26th May, an unusually early date, up to 12th September, while Marshall found a nest with the eggs almost hatching in the middle of May. The great majority of birds do not lay, however, until the Rains have broken in the end of June.

Three or four eggs form the usual complement and, though I have heard of five in a clutch, I have never seen one containing this number.

The eggs are merely rather large editions of those of the Malkohas and Sirkeers. They have the same hard sub-shell with the same soft chalky incrustation of lime all over, often with a superficial polish. Shell and chalky covering are alike pure white when first laid but the latter soon becomes stained and yellowish. In shape they are broad ellipses or spheroidal, only abnormal eggs being at all lengthened or smaller at one end than the other.

Fifty eggs average 35.9×28.0 mm. : maxima 38.9×29.6 and 35.8×29.9 mm. ; minima 31.6×26.4 and 38.1×25.7 mm.

Both birds share in incubation and both take part in the building of the nest.

They sit fairly close when the nest is well hidden but, at other times, unless the eggs are nearly hatching, flutter off the nest while the intruder is at some distance. These Cuckoos vary individually very much in holdness or the reverse. Some will desert their nests even if hardly touched while others are very bold, as in a case mentioned by Mr. B. Aitken in which the Cuckoo continued to sit, after two eggs out of four had been taken, and hatched and reared chicks from the two left.

(1491) *Centropus sinensis intermedius* (Hume).

THE BURMESE CROW-PHEASANT.

Centropus sinensis intermedius, Fauna B. I., Birds, 2nd ed. vol. iv, p. 192.

The Burmese race of Crow-Pheasant is found from Assam South of the Brahmapootra, Cachar, Sylhet, the districts of Eastern Bengal East of the Bay, all Burma, the Northern Malay States, Siam and the Indo-Chinese countries to Hainan.

This is a bird of the plains and lower hills. In Assam it occurs up to some 3,000 feet or even 3,500 where there are great stretches of grass-land, and in Burma it ascends to about the same height under the same conditions. It frequents just the same kind of country as the preceding form but appears to be even more fond of grass-land.

The nest is similar to that of the last bird but is usually made more exclusively of grass, sometimes with a lining of green leaves, and is globular with very few exceptions.

The principal laying months are the latter half of June to the end of August, but in Tenasserim Hopwood and Mackenzie found them breeding in April and again in July and August. Four eggs are laid more often than three, even in the South of their breeding area.

Fifty eggs average 35.7×28.6 mm.: maxima 39.1×30.0 and 37.4×30.4 mm.; minima 30.4×28.5 and 35.1×26.0 mm.

Both birds incubate and both assist in building the nest, which takes from four days only to about ten days to complete.

Incubation takes not less than sixteen days, as four eggs, which looked fresh, found in a nest on the 1st June had just hatched when inspected on the 17th of that month.

The fledglings do not leave the nest until about a month old, by which time the globular nest has sometimes become a mere untidy platform.

(1492) *Centropus sinensis parroti* Stresemann.

THE SOUTHERN CROW-PHEASANT.

Centropus sinensis parroti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 192.

The Southern Crow-Pheasant is found in Ceylon and in South-Western India South of the range of the Northern Crow-Pheasant and the preceding bird. Its range in South-East India has not yet been worked out.

In Ceylon this Crow-Pheasant breeds from March to September.

The nest seems to be sometimes a very deep cup and not domed. Tunnard took two or three nests of this description on the Norwood Estate in the Central Province, one in a seed Tea-bush 15 feet from the ground and the other in a *Grevillea*-tree.

In Travancore, where Bourdillon says this Cuckoo is very common, the nests were "large round nests of twigs etc. 5 to 10 feet from the ground in bushes." Phillips (Ceylon), Kinloch (Nelliampathy Hills), Pitman (Chanda), Vidal (South Konkan) and Miss Cockburn (Nilgiris) all describe the nests as being domed.

The complete complement of eggs is two to four, though the latter number never seems to be laid in Ceylon.

Thirty eggs average 36.2×26.3 mm.: maxima 40.3×30.1 and 39.2×30.8 mm.; minima 32.3×24.0 mm.

(1493) *Centropus chlororhynchus* Blyth.

THE CEYLON CROW-PHEASANT.

Centropus chlororhynchus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 193.

This Crow-Pheasant, which might well be called the Yellow-billed Crow-Pheasant from that very distinct feature, is restricted to the humid forests of the South-West hill-region of Ceylon, ascending there to a height of some 2,500 feet.

Wait says that it is an inhabitant of the deep jungle where the undergrowth is thick and tangled, and that it very seldom emerges into the open. The breeding season according to him is from January to July, and Jenkins took three nests for me, one in January and two in March. The nests were described to me by Jenkins as "domed nests of sticks, twigs, roots and grass lined with green leaves and supple green twigs. All these were placed in thorny bushes about 4 feet or 5 feet from the ground and were found in the interior of deep evergreen forest."

The complete clutch is probably generally two, more rarely three eggs.

The eggs are quite typical of the genus. Nine average 34.7×27.0 mm.: maxima 36.5×26.2 and 35.0×29.2 mm.; minima 34.0×25.9 and 34.5×24.0 mm.

(1494) *Centropus andamanensis* Tytler.

THE ANDAMAN CROW-PHEASANT.

Centropus andamanensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 194.

This species is found in the Andamans and Cocos Islands only.

The nest is described by Osmaston, Wickham and Anderson as being just like that of the Common Crow-Pheasant, but apparently, it is always domed and generally lined with green palm-leaves or cane-leaves. It is noticeable also that the nest seems to be nearly always placed comparatively high up, all those taken by Osmaston being from 8 feet to 15 feet from the ground, while one other was 20 feet up in a small tree. Most nests were placed well inside dense leafy bushes, one in a thick tangle of creeper growing up a tree-trunk.

The main breeding season is from the middle of May to the end of July, but Osmaston took one nest on the 1st April and Wickham obtained another in February.

The eggs number two or three, occasionally four, and are in every way typical.

Thirty eggs average 34.7×28.0 mm.: maxima 37.1×29.1 and 35.0×29.9 mm.; minima 32.3×28.0 and 34.8×26.0 mm.

Centropus bengalensis.

THE LESSER CROW-PHEASANT or COUCAL.

(1495) *Centropus bengalensis bengalensis* (Gmelin).

THE COMMON LESSER CROW-PHEASANT.

Centropus bengalensis bengalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 194.

This Coucal has a very wide range. A single specimen has been obtained in Ceylon. Thence it occurs over the whole of South-Western India from Travancore to Kanara in the Bombay Presidency;

Wynaad, Mysore, Orissa, Bengal, Bihar, Assam, Burma South to North Tenasserim; Siam, the Indo-Burmese countries, Hainan, Yunnan and South-West China to Formosa.

Ticehurst considers that the birds found in the South of Tenasserim and the Malay States are nearer to the Javan form, *C. b. javanensis* Dumont.

In habits and nidification this Crow-Pheasant very closely follows its larger cousins. It is found in the plains and in the hills up to about 5,000 feet, though more commonly below 3,000 feet. It is, perhaps, more strictly a grass-loving bird than any of the *sinensis* group, but it is also found sometimes in scrub of all sorts and also in secondary growth.

The nests are placed either in low dense bushes standing in grass or in thick tussocks of grass or reeds and, even when placed in bushes, they seem nearly always to choose one in which grass is more or less mixed up with the foliage. They are always placed low down, generally about 3 or 4 feet, often within a few inches of the ground and never, so far as I am aware, over 6 feet from it.

The nest is very much like that of *Centropus sinensis*, but decidedly smaller, measuring between 6 by 6 inches to about 8 by 10, one taken by Shopland near Calcutta measuring 12 by 8 inches. It is made principally of grass and very often the living grass in which it is built is incorporated in the nest, the blades being turned over and intertwined loosely with the other grass of which the nest is composed. Rarely twigs and leaves, especially bamboo-leaves, are worked in with the grass, but the use of these is exceptional, and two nests out of every three are built entirely of grass, living or dead. Gammie says that the nest is occasionally lined with green leaves, while Inglis says that they are neatly lined with thatching grass. I have never seen green leaves used and the thatching grass in those I have examined has been just the same as that used for the body of the nest.

In India the Lesser Coucal breeds from May to September. In the plains most birds breed after the Rains break in June, but in the hills many birds lay in May and a few in April. In Siam also Herbert found them breeding in April. In Malabar Vidal took their eggs in August and September.

The normal full clutch is three or four, but two eggs only are often incubated, while I twice took clutches of five in North Cachar.

The eggs are just small replicas of those of the Larger Coucal, but on the whole are more spherical.

Fifty eggs average 28.2×23.8 mm.: maxima 34.1×24.3 and 28.6×25.3 mm.; minima 25.0×22.0 and 27.7×21.9 mm.

The birds sit close and have the same flustered way of leaving the nest common to the family. When leaving they generally drop to the ground at once and scuttle away through the grass on foot.

Both birds incubate and both take part in building the nest.

Suborder PSITTACI.

(PARROTS.)

Family PSITTACIDÆ.

(PARROTS and PAROQUETS.)

All the Paroquets lay their eggs in natural holes in trees, walls etc. and make no nest, and all lay white eggs of a close firm texture, smooth but with very little or no gloss except when fresh, while in shape they are normally spheroidal or broad ovals. For their size they are rather brittle eggs. They vary only in measurements, and this description suffices for the eggs of the whole family.

Psittacula eupatria.

THE LARGE PAROQUET.

(1496) *Psittacula eupatria eupatria* (Linn.).

THE CEYLONESE LARGE PAROQUET.

Psittacula eupatria eupatria, Fauna B. I., Birds, 2nd ed. vol. iv, p. 198.

This Paroquet is common in Ceylon and Stewart also obtained it in Travancore. Jerdon believed he had seen these Paroquets in the Carnatic, while those seen by Taylor in Mysore and by Jerdon in Malabar were almost certainly of this species. I have also a clutch of eggs of this species taken by Davidson, one of which is fully scribed by him, taken in Silpandy, Southern Khandesh. They must, however, be very rare in all these districts as there is nothing more on record about any of them.

In Ceylon this bird is common, being found from the plains up to about 3,500 feet, though more often below 1,000. It breeds in almost any kind of country—forest, open woods, quite open and cultivated land and even in gardens and parks. In spite of this there is very little known about its nesting habits, and I have never been able to secure its eggs from Ceylon.

Wait sums up what is known as follows ('Birds of Ceylon,' 2nd ed. p. 223):—"The breeding season is from November to about March. The birds usually select natural holes in trees on the outskirts rather than in the interior of forests, increasing these holes to a suitable depth and size. Two to four white glossless eggs are laid. Average size about 1.2 by .95" (=30.5×24.1 mm.).

The two eggs taken by Davidson on the 9th January measure 32.9×26.5 and 34.5×26.6 mm.

(1497) *Psittacula eupatria nepalensis* Hodgs.

THE INDIAN LARGE PAROQUET.

Psittacula eupatria nepalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 109.

The actual breeding range of this Paroquet has not been very well defined. It breeds in the hills of the Western Himalayas as far East as Nepal and over the whole of Northern India in the plains as far as Western Bengal, whence it has been recorded from Calcutta, though I should expect the Calcutta birds to be *indoburmanica*. South it occurs in Raipur and Sambalpur in the Central Provinces and also in the West as far South as Kanara. These last birds again may be the same as the Ceylon form, an opinion undoubtedly finally held by Davidson.

Like the last race, this Paroquet may be found in any kind of country, and is common in Northern India in gardens, avenues to roads and in cultivated land round villages. It will breed in practically any tree which suits its convenience. Possibly Mango-trees in groves provide the favourite nesting sites and, as a rule, they prefer to make their nesting-holes at great heights from the ground, somewhere between 20 and 40 feet up. At the same time many nests may be taken between 10 and 20 feet from the ground. Hutton says that he has found the Cotton-tree (*Bombax heptophyllum* and *B. malabaricum*) the favourite trees for nesting, while some birds select such hardwood-trees as the Sâl (*Shorea robusta*). As a rule the birds choose natural holes in which to deposit their eggs; in some cases these are used just as they are, but often the birds enlarge both the entrance and the internal chamber. At other times these Paroquets drill neat circular holes into rotten trees and cut out the whole of the chamber for themselves, while occasionally they are said to hollow out their homes in trees which are quite sound and hard. It is said also that they sometimes make use of deserted nesting-holes of Barbets or Woodpeckers, enlarging those which are not big enough to allow of their easy entrance and exit.

Osmaston took one clutch of eggs "in a square hole in the dome of a big mosque-like building in Peshawar city, 50' up. Nest of straw, feathers etc. (a deserted Myna's nest)."

Often, of course, the holes used by Paroquets in trees have been previously occupied by Mynas, Pied Robins etc., and then the old nests of these birds are not turned out but serve as soft beds for the young Paroquets; at the same time I do not think the birds themselves ever make a nest of any sort.

Ticehurst (Ibis, 1923, p. 43) thinks that in Sind this bird is not indigenous but that the birds, which are now "common in Karachi, but are not found elsewhere, are all the descendants of escaped birds." This, however, is not the case. Bulky took the eggs of this Paroquet before I went to India in 1881 near Karachi,

and Eates tells me that the bird is extremely common in Upper Sind in many places. At Ubauro he found forty nests in one day in February mostly containing callow young, but a few with eggs, of which he sent me a clutch of four. The inhabitants spoke of the birds as being known from all time "within human knowledge."

In Karachi Ticehurst says it "breeds early, and chiefly utilizes bungalow chimney-pots for nesting in the absence of suitable trees"; But Eates found them "breeding in holes in large siris, pipal and lai trees."

The breeding season is from December to April, most birds laying in January and February.

The full clutch consists of three or four eggs.

Sixty eggs average 35.2×28.7 mm.; maxima 29.7×29.0 and 35.7×30.3 mm.; minima 32.2×28.4 and 34.9×27.3 mm.

Both sexes incubate and both assist in making the nest-hole, which work proceeds at a great speed. If the wood is at all soft the birds tear out great fids in their powerful bills, and a couple of hours suffices to make the entrance and two or three more to complete the nest-chamber. When the wood is hard the work may take a week or even ten days.

The birds sit very tight, often refusing to move and attacking with savage bites any hand which may be foolishly inserted. Anyone wishing to remove eggs of any Paroquet should swathe their hands in a cloth or wear very stout leather gauntlets.

Hutton says that incubation takes about twenty-one days, and I have found that with the next race, *indoburmanica*, nineteen to twenty-one days is the time occupied. The fledgling period lasts over a month.

(1498) *Psittacula eupatria indoburmanica* Hume.

THE BURMESE LARGE PAROQUET.

Psittacula eupatria indoburmanica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 200.

This race may be said to range from Sikkim and, perhaps, Eastern Nepal to Eastern Assam.

The birds of Dacca, Mymensingh and the districts East of the Bay of Bengal are all of this race, as are those of the Sunderbunds. It is found over the whole of Burma, as far South as Amherst, and in Siam, Annam and Cambodia.

The breeding habits and the country frequented differ in no way from those of the preceding races, but I have occasionally found them breeding in comparatively deep forest in Assam. Here we found several nests that were quite impossible to get at except at an unprofitable cost of time and labour. These were made in natural hollows 70 and 80 feet from the ground in *Bombax* and

other trees. The birds were unmistakable and their deep hoarse cries were alone sufficient for identification. Now and then we found nests we could reach and these generally held three or four young or eggs.

The birds were very common in Gowhaty, breeding in trees in the station itself. Here the nest-holes were nearly always comparatively low down, several holes with young ones being examined at heights between 8 and 15 feet up in Mango and other trees.

They breed in December and January in Assam, a few birds continuing to the end of March, while in Arakan Hopwood and in Promé Mackenzie took three eggs in March. Oates, however, obtained hard-set eggs on the 25th February in Lower Pegu and Darling found four fresh eggs in a hole of a tree, 32 feet from the ground, on the 10th December at Weppitan in Tenasserim.

Twenty eggs average 33.8×27.5 mm. : maxima 35.9×29.0 and 35.3×29.8 mm. ; minima 31.7×25.0 mm.

(1499) *Psittacula eupatria magnirostris* Ball.

THE ANDAMAN LARGE PAROQUET.

Psittacula eupatria magnirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 201.

This form is at present restricted to the Andamans and Cocos Islands, but I have little doubt that when more material is available birds from the latter islands, with their small bills and small size, will have to be separated.

The nidification of this race is similar to that of others of the species, but they seem to make their nest-holes at prodigious heights from the ground. Osmaston writes of one :—"The nest was in a hole in a huge Gurjan-tree 150' from the ground. The tree was branchless for over 100' and the nest was reached by a Burmese convict after several hours' work forming a ladder up to it by tying giant ladders all the way up the trunk." Another nest was 60 feet up, while Wickham writes of a third taken for him :—"My *P. magnirostris* was a devil of a climb; I could not watch the man making it, well up over 100 feet in an immense jungle-tree. The male, a grand bird in splendid plumage, I saw feeding the female, who came out of the hole to be fed and then retired back into it again. The nest was more than 8 feet in from the entrance-hole. As I write the same nest-hole is now occupied by a pair of *Palæornis fasciatus*, which is perhaps the most common bird of the genus here."

The birds lay two or three eggs only and these are deposited in February and March.

Ten eggs, all I have seen, average 35.1×28.2 mm. : maxima 36.1×28.3 and 34.1×29.0 mm. ; minima 34.0×27.1 and 36.1×26.3 mm.

Psittacula krameri*.*THE ROSE-RINGED PAROQUET.**(1500) ***Psittacula krameri manillensis* (Bechst.).****THE INDIAN ROSE-RINGED PAROQUET.***Psittacula krameri manillensis*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 202.

The Rose-ringed Paroquet is found over Northern India from Sind, the Punjab and the North-West Provinces along the base of the Himalayas to Bihar. It is common in Western Bengal and Orissa and over Southern India and Ceylon.

This bird is one of the most widely spread and best known of Paroquets, extremely common in all open cultivated country round towns and villages, where it breeds in holes in trees and also in holes in walls, factory chimneys and, occasionally, even in holes in the outer walls of occupied buildings. In trees the holes it prefers are natural ones, often of some size, occasionally small and having to be enlarged by the birds. At other times they take the nesting-holes of Barbets and Woodpeckers and now and then cut out a nest for themselves. The favourite tree is undoubtedly the Mango and often two or more pairs may be found occupying holes in the same tree, while Coltart and I in Bihar came across trees in orchards affording nesting sites to two or three pairs of this Paroquet and also for Nuthatches, Rollers and Titmice.

The nest-holes selected are quite low down; I have taken them at 2 or 3 feet from the ground and seldom over 20.

They breed freely in gardens which have suitable trees and are most fearless of man, entering their homes freely in his presence and fighting, beak and claw, any hand that interferes with it. One bird I hauled out in a pugree, directly she was let go at once darted back to the nest, although it contained quite fresh eggs.

The breeding season is principally in February and March, but eggs in January and April are quite common. Davidson says that in Western Khandesh it breeds in January and February, and they also breed in Ceylon during the former month.

The eggs number five or six and occasionally seven.

One hundred eggs average 30.5×24.3 mm.: maxima 34.1×25.0 and 31.3×25.7 mm.; minima 28.0×23.0 and 28.7×22.9 mm.

Hutton describes the courting habits of this Paroquet, which are quite similar to that of others. He says:—"At the pairing season the female of this species becomes the most affected creature possible, twisting herself into the most ridiculous postures, in order, apparently, to attract the notice of her sweetheart, and uttering a low twittering note the while in the most approved style of flirtation, while her wings are half-spread and her head kept rolling from side to side

in demigrations; the male sitting quietly by her side, looking on with wonder as if fairly taken aback—and wondering to see her make such a guy of herself. The only return the male made to these antics was scratching the top of her head with the points of his beak, and joining his bill to hers in a loving kiss.”

It is only fair, however, to add that the male goes through exactly the same performances as the female.

(1501) *Psittacula krameri borealis* Neumann.

THE EASTERN ROSE-RINGED PAROQUET.

Psittacula krameri borealis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 204.

The Eastern form of this Paroquet is found from Sikkim along the Eastern Himalayas to Eastern Assam, Eastern Bengal and the whole of Burma as far South as Pegu.

There is nothing one can add about the breeding of this subspecies which is different to that of the preceding. Cripps says that he found it breeding in Dibrugarh in June, but Coltart and I both obtained nests with young in February, January to March being almost certainly the normal breeding season.

Twenty eggs average 29.3×24.0 mm. : maxima 30.1×24.4 and 29.9×25.2 mm. ; minima 28.0×22.3 mm.

Psittacula cyanocephala.

THE BLOSSOM-HEADED PAROQUET.

(1502) *Psittacula cyanocephala cyanocephala* (Linn.).

THE WESTERN BLOSSOM-HEADED PAROQUET.

Psittacula cyanocephala cyanocephala, Fauna B. I., Birds, 2nd ed. vol. iv, p. 204.

This little Paroquet is found all over Ceylon and India, ascending the Himalayas to an elevation of about 6,000 and 7,000 feet. On the East it extends to Western Bengal, Bihar, Sikkim and the Bhutan Doors.

The Blossom-headed Paroquets are just as entirely birds of civilization and of towns and villages as are those of the Rose-ringed species.

Their breeding habits are also much the same but the birds have certain features peculiar to themselves. In the first place, as Hume says, they seem to prefer to cut out their nest-holes for themselves, making neat, circular entrances into them. They also very often breed in company. Hutton says: “Many breed

together in the same tree, and they evince a social and gregarious disposition."

At the same time many birds select natural hollows in trees for their nesting places and many nest all alone.

There is a considerable amount of local movement of these birds for breeding purposes. Aitken (B.) says that the great majority of Rose-headed Paroquets retire to the hills to breed. "In Berar about the middle of June I observed flocks of these birds arriving after an almost total absence of several months."

Over the greater part of its range most birds breed from February to the end of March, but many birds breed in January. Davidson and Wenden say that in Satara it breeds in December and in the Ghats during March.

In the hills it breeds in March and April, a few birds not laying until early May.

The eggs number four or five in a clutch, though sometimes six are laid. In shape they are rather more spherical than are most Paroquet eggs, but otherwise are quite typical.

Fifty eggs average 24.0×20.2 mm. : maxima 26.0×20.2 and 25.4×21.1 mm. ; minima 22.2×19.7 and 23.8×19.4 mm.

(1503) *Psittacula cyanocephala bengalensis* (Forst.).

THE EASTERN BLOSSOM-HEADED PAROQUET.

Psittacula cyanocephala bengalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 206.

This race takes the place of the preceding in the Himalayas from Eastern Nepal to Assam ; Bengal ; the whole of Burma as far South as Tenasserim and then East through Yunnan, the Shan States and the Indo-Chinese countries to South China.

The nidification is similar to that of the preceding race, but this bird often breeds in buildings and walls. I found a huge flock of several hundreds breeding in the high flat wall of an old temple near Tarkeswar. The wall must have been 40 feet high or more, most birds breeding in the upper part, in small recesses in the wall or in holes where bricks had fallen out. The birds collect round their breeding places in December and lay from January to March, a few birds only laying in April. Many birds breed in large and small colonies in Mango-groves in Bengal during March and April, while in the Assam hills many birds breed in April and early May.

Forty eggs average 25.0×20.4 mm. : maxima 28.5×22.0 mm. ; minima 22.0×19.1 mm.

The male and female, when sitting, often refuse to move until they are lifted out of the hole, hissing loudly and biting fiercely at the hand which holds them.

Psittacula himalayana* *.*THE SLATY-HEADED PAROQUET.****(1504) *Psittacula himalayana himalayana* (Lesson).****THE HIMALAYAN SLATY-HEADED PAROQUET.***Psittacula schisticeps schisticeps*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 206.

This Paroquet ranges through the Himalayas from Kashmir, Kuman, and Garhwal to Western Assam in Goalpara and Kamrup.

It is more a forest bird during the breeding season than the species we have already dealt with, generally breeding in thin forest, and it is particularly fond of Oak-trees for nesting purposes. At times it may be found in well-wooded open country breeding in trees by roadsides and in orchards. It makes use of natural holes or cuts one out for itself, and frequently deposits its eggs at great depths from the entrance. Marshall says that it generally selects holes in trees at great heights round about Murree, where it nests at 6,000 to 7,000 feet. Jones, who noticed they kept very closely to Oaks (*Q. incana*), round Simla found nest-holes at all heights, while in Kuman and Naini Tal Whympier obtained most of his clutches from holes in "toon" trees comparatively low down, 15 to 20 feet from the ground. Here they were breeding between 4,000 and 5,000 feet.

They lay from late in March to the end of April, though Hume took one nest on the 5th May.

The full clutch of eggs is three to five, generally four.

Forty eggs average 28.3×22.2 mm. : maxima 30.3×25.0 mm. ; minima 27.1×22.0 and 27.3×21.2 mm.

(1505) *Psittacula himalayana finschi* Hume.**THE BURMESE SLATY-HEADED PAROQUET.***Psittacula schisticeps finschi*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 208.

The present Paroquet is found in Assam, both North and South of the Brahmapootra, and in the whole of Burma as far South as Tenasserim.

I obtained this bird nearly always in thin forest of Oak or other deciduous trees during the breeding season at all heights from the foot-hills up to some 6,000 feet, the favourite elevation being between 2,000 and 3,000 feet. They often breed in small colonies, one pair to each small tree, in an area of some two or three hundred yards diameter, cutting out small, neat entrance-holes in trees which are sound or which have partially decayed centres. When sound trees are selected the nest-chamber is small, perhaps 4 to 5 inches across

* *Palæornis schisticeps* Hodgson, As. Res. vol. xix, p. 178, 1836, is antedated by *Psittacus himalayana* Lesson, Voy. Ind. Orient., Zool. p. 239, 1832: Himalayns.

by little more in depth, while the tunnel to it is a few inches only. When, however, the cores of the tree are decayed the birds excavate to a great depth and make quite unnecessarily big chambers.

They breed chiefly in April and May, but a small colony I came on in the North Cachar Hills all had young, some quite advanced, in the first week in April, so many must lay in March or even in February.

At Popa, in Upper Burma, Macdonald says they breed in January and February, and Cook found them breeding in these months in the South Shan States, while Hopwood and Mackenzie give February and March as the breeding months in Southern Burma.

Like the typical form, they lay three to five eggs, thirty of which average 27.1×21.5 mm. : maxima 29.8×23.5 mm. ; minima 24.4×21.9 and 28.0×20.2 mm.

Both sexes work at the excavation of the nesting-holes and both incubate, but the female does more of the latter than her husband, who, however, spends much of his time in bringing her dainty morsels to eat.

Incubation takes about fifteen days, while the fledgling period is from three to four weeks.

Like most Paroquets, these birds are single-brooded.

(1506) *Psittacula melanorhyncha* Sykes.

THE BLUE-WINGED PAROQUET.

Psittacula columboides, Fauna B. I., Birds, 2nd ed. vol. iv, p. 208.

Psittacula melanorhyncha, ibid. vol. viii, p. 676.

This little Paroquet occurs on the South-West of India from about the latitude of Poona in the North of the Bombay Presidency to Travancore in the South.

In Travancore Bourdillon says it is common in the South up to some 3,000 feet but that in the North it ascends to 6,000 feet.

The Blue-winged Paroquet haunts much the same type of country as does the Slaty-headed but, unlike that bird, apparently always makes use of natural hollows at great heights in trees and never excavates a hole for itself, not even to the extent of cutting entrances into rotten wood.

F. Bourdillon obtained nests on the 6th January (1 fresh egg), the 20th January (2 fresh eggs) and the 16th February (4 hard set), and adds that the breeding season may be said to be from the 1st January to the close of March. The nests were taken at heights between 16 and 100 feet from the ground.

Stewart, whose notes on the breeding agree with that of Bourdillon, took a fine series of eggs, now in my collection, in January and February, while Aitken had nestlings brought in to him on the 24th May taken in the hills near Poona.

Twenty-five eggs average 28.3×24.5 mm. : maxima 30.3×25.1 mm. ; minima 27.0×22.3 mm.

(1507) *Psittacula calthrapæ* Layard.

THE EMERALD-COLLARED PAROQUET.

Psittacula calthrapæ, Fauna B. I., Birds, 2nd ed. vol. iv, p. 209.

This beautiful little Paroquet is restricted to South and Central Ceylon, where it ranges from the plains adjacent to the hills to the highest hills at about 6,000 feet.

There is very little known about the nidification of this bird. Wait snms up what has been recorded as follows ('Birds of Ceylon,' 2nd ed. p. 225, 1931):—"A forest bird found in fair-sized flocks on the outskirts of woods, in open spaces in the jungle, and in the wooded gorges of patanas. The breeding season lasts from January to May; the nests and eggs are of the usual type. The nest-hole is often in dead coconut-trees, sometimes high up in big forest trees. The eggs are from one to three in number. Average size .97 by .78 inch" (=about 24.6×19.8 mm.).

Jenkins sent me a clutch of three and a single hard-set egg, all taken from holes in lofty forest-trees on the 20th March, but a clutch of three and another of two sent me by Lazarus with the skins. Of the female parent were taken on the 2nd and 26th of January respectively from holes right at the top of dead Coconut-trees.

Nine eggs average 24.7×19.2 mm.; maxima 26.0×19.6 and 25.6×19.7 mm.; minima 23.0×19.6 and 23.9×19.0 mm.

It is probable that, though in two instances Lazarus caught the female on the nest, both birds help in incubation. Jenkins caught a Paroquet also on both the clutches he took, but released them as soon as he had satisfied himself as to their species.

Psittacula alexandri Odhel.

THE RED-BREASTED PAROQUET.

(1508) *Psittacula alexandri fasciata* Müller.

THE INDIAN RED-BREASTED PAROQUET.

Psittacula alexandri fasciata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 210.

This fine Paroquet ranges from Kuman, through the Lower Himalayas, to East and South Assam; from the last province it extends to the whole of Burma and the Indo-Chinese countries, through Yunnan and West China, to Hainan and South China. It is also found in the Andamans but not in the Nicobars.

These Paroquets breed in both dense and thin forest, open well-wooded country and in cultivated lands around villages and even towns, while they are found at all heights from the plains up to about 6,000 feet, most birds nesting between 1,000 and 3,000 feet.

Thompson says that those Paroquets breeding in the Sub-Himalayan ranges are restricted to the lofty Sâl forests and that the

breeding commences in March and continues until May, when the young birds leave the nest.

This does not agree with my own experience, for I have found them nesting in every kind of country, and I think most birds lay in January and February and a few even in December, as I have seen young well on the wing on the 12th March. It is true that I have taken eggs as late as the 10th April and once—this was a second laying—on the 3rd May, but these were both exceptional.

In Kuman at 4,000 feet Whymper took eggs up to the 9th April, but in Burma Hopwood, Mackenzie, Cook and others all took eggs in January and February, while in the Andamans Osmaston found numerous nests between the 4th February and 1st March.

Preferably they lay their eggs in natural holes in trees between 10 and 20 feet from the ground, but many make use of holes as low as 5 feet, while others occasionally resort to those at 50 feet. Some few birds excavate holes for themselves or enlarge and improve the entrances to natural holes, several pairs often breeding in company. I have found as many as six pairs breeding in one tree and colonies of a dozen or more pairs in various trees standing close together.

They lay three or four eggs only and I have seen no bigger clutches. It is rather noticeable that quite a fair number of the eggs are less spherical than most eggs of Paroquets and a few are quite pointed at one end.

Fifty eggs average 30.9×25.6 mm.; maxima 33.1×29.0 mm.; minima 26.9×23.0 mm.

The male is a most exemplary husband, sharing in the work of excavation, incubation and looking after the young, in addition to which he employs all his spare time in feeding his wife.

Incubation, I think, takes sixteen to seventeen days. Eggs seen in the nest, apparently just laid, on the 1st February were hatched on the 18th, the young appearing a few hours old.

Psittacula nicobarica.

THE NICOBAR RED-CHEEKED PAROQUET.

(1510) *Psittacula nicobarica nicobarica** (Gould).

THE NICOBAR RED-CHEEKED PAROQUET.

Psittacula erythrogonys erythrogonys, Fauna B. I., Birds, 2nd ed. vol. iv. p. 213.

Psittacula nicobarica nicobarica, ibid. vol. viii, p. 676.

This Paroquet is confined to the Nicobars, where Davison found

* As noted in vol. viii, *P. erythrogonys* of Blyth, 1846, is preoccupied by *Conurus erythrogonys* of Lesson, but it is very difficult to make out what his bird really is. It cannot be the same as Blyth's, as it is a bird with a purple head inhabiting Bengal. It might be the same as *melanorhyncha*, and the emerald-green collar points to this, but it seems best to consider it as indeterminate.

two occupied nesting-holes on the 17th February and the 2nd March. Each of these contained two young birds, one being about 12 feet up in a Screw-Pine (*Pandanus*) and the other 50 feet up in a big forest tree.

(1511) *Psittacula nicobarica tytléri* Hume.

THE ANDAMAN RED-CHEEKED PAROQUET.

Psittacula erythrogastris tytléri, Fauna B. I., Birds, 2nd ed. vol. iv, p. 214.
Psittacula nicobarica tytléri, ibid. vol. viii, p. 676.

The present race of Red-cheeked Paroquet takes the place of the preceding bird in the Andamans group, including Barren Is., Narcondam, the Cocos and Prepara.

Osmaston in 1906-7 and Wickham in 1908 obtained good series of the eggs in February and early March, the birds breeding in natural holes in trees on the edges of forest, avenues on the sides of roads and in odd trees standing in the cultivation round Port Blair. The nest-holes seem in no instance to have been at any height, nearly every one being in a Padouk-tree between 10 and 25 feet from the ground.

Except for one clutch of four eggs only twos and threes were found.

Thirty of these average 30.6×24.7 mm. : maxima 34.2×25.0 and 30.1×26.1 mm. ; minima 28.4×24.4 and 30.9×23.0 mm.

Psittinus cyanurus (Forster).

THE LITTLE PARROT.

(1512) *Psittinus cyanurus macropterus* (Kuhl).

THE MALAY LITTLE PARROT.

Psittinus incertus macropterus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 215.
Psittinus cyanurus macropterus, ibid. vol. viii, p. 677.

This tiny Parrot is found within our limits in Tenasserim from about the latitude of Nwalabo and Tavoy, South to Singapore. It also occurs in peninsular Siam. It may also be found breeding considerably further North, as Hopwood obtained it about 100 miles North of Tavoy in January and believes it to be resident there.

In the breeding season it keeps much to dense evergreen forest, though very little is known about the nidification.

Kellow obtained several clutches of eggs in the vicinity of Simpang late in May, sending me three clutches, in each case with the parent bird, which had been caught as she—they were all females—sat on the eggs.

In all three instances the eggs were taken from small natural hollows high up in living forest trees growing in deep evergreen forest. The eggs were all much incubated.

They are quite typical little Parrots' eggs in every respect, two clutches numbering three each and the third only two. They were taken on the 20th and 25th May, but a single fresh egg was obtained by Mr. Kellow on the 2nd February.

The nine eggs average 24.2×20.0 mm. : maxima 26.5×21.3 mm. ; minima 22.9×17.5 mm.

Coryllis vernalis.

THE LORQUET.

(1513) *Coryllis vernalis vernalis* (Sparrrn.).

THE INDIAN LORQUET.

Coryllis vernalis vernalis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 217.

This quaint little Loriquet occurs all along the foot-hills of the Himalayas from Sikkim to Eastern Assam and the Eastern districts of Bengal. It is also found over the whole of Burma to the extreme South and in peninsular Siam. It is very common in the Andamans.

It is a bird of open forest, both evergreen and deciduous, of secondary growth and mixed bamboo- and small-tree jungle. In the breeding season it is rare in dense forest, and I have only once found it nesting in such. It occurs from the foot-hills up to 5,000 feet but, I think, is most common about 2,000 feet.

In North Cachar I took eggs from small natural holes in trees from the level of the ground up to about 15 feet above it. As a rule the bird makes use of the hole just as it is, but occasionally enlarges the entrance and improves the shape of the inside chamber or, still more rarely, cuts out a small hole for itself.

Osmaston, who found numerous nest-holes in the Andamans, obtained many eggs from small natural holes at the bottom of Padouk-trees, both living and dead, in some cases the egg-chamber being actually below the level of the ground. Wickham says that in the Andamans they are very tame confiding little birds, breeding in the gardens, though their favourite resort is in the Teak-plantations. Here also he notes that the entrance-holes to the chambers were very low down, though many, on the other hand, were "just out of reach."

In Assam the breeding season is from the beginning of February to the end of April, but in the Andamans Osmaston and Wickham obtained eggs from the 3rd January up to the 15th March, the latter date being exceptionally late.

They lay three or four eggs, quite typical of the family, very spherical and often stained quite a deep yellow-brown from the dead touch-wood on which they lie.

Thirty eggs average 19.1×15.8 mm. : maxima 21.0×15.5 and 19.4×17.0 mm. ; minima 17.5×15.3 and 18.2×15.1 mm.

Both sexes incubate, the female doing most of this duty, but being assiduously fed and tended by the male all the time.

(1514) *Coryllis vernalis rubropygialis* Stuart Baker.

THE MALABAR LORQUET.

Coryllis vernalis rubropygialis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 218.

The Malabar Loriquet extends from about the latitude of Bombay City South to Cape Comorin. It is not rare in the Nilgiris, and Kinloch records it from the Nelliampathy Hills.

Its nidification is probably quite similar to that of the typical form, but I have only two notes on its breeding. On the 15th March Bourdillon took three eggs, and records (Journ. Bomb. Nat. Hist. Soc. vol. xv, p. 666, 1918):—"One nest I found was at the top of a hollow stump over which a creeper was growing, which formed a sort of cover. It was about 15 feet from the ground and contained three very hard-set eggs. This was at an elevation of 2,000 feet." Stewart also obtained a set of three in Travancore, at the same elevation and, like Bourdillon's, in a tree in a clearing in forest, on the 6th January. The three eggs taken by Stewart measure 20.5×16.0 , 18.6×16.8 and 18.6×16.0 mm.

Bourdillon gives the average of the three eggs taken by him as $.73 \times .58$ inch (=about 18.5×15.0 mm.).

(1515) *Coryllis beryllinus* (Forster).

THE CEYLON LORQUET.

Coryllis beryllinus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 219.

This little Loriquet is found only in Ceylon, where Wait says it is a very familiar little bird, being constantly found in gardens and round about villages, tea-plantations etc. at all elevations from the foot-hills up to some 4,000 feet.

He adds: "The breeding season lasts from March to June. For its nest it chooses a small natural cavity in a tree, excavating the interior to a depth of 2 to 4 feet. The clutch consists of two or three eggs, laid on a pad of green leaves spread about an inch thick at the bottom of the hole. They are white and glossless and measure about $.75 \times .62$ inch."

Three eggs given to me by Wait, taken on the 14th February, measure 18.8×14.8 , 18.9×15.0 and 18.4×14.9 mm.

Jenkins, who, however, failed to get eggs, told me that they sometimes laid their eggs in holes in Toddy-palms and that the birds had been known to get drunk and almost helpless on the juice.

Suborder CORACII.

Family CORACIIDÆ.

(ROLLERS.)

Coracias garrula Linn.

THE EUROPEAN ROLLER.

(1516) *Coracias garrula semenowi* Loud. & Tschusi.

THE KASHMIR ROLLER.

Coracias garrula semenowi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 222.

The race *semenowi* was created for the Transcaspian bird, which is on an average a smaller bird than the Kashmir one, with comparatively shorter tail and weaker bill.

The Kashmir Roller is found throughout the North-West Himalayas at all heights between 4,000 and 8,000 feet and occasionally both higher and lower. It is very common on the Afghanistan and Baluchistan frontiers and from Gilgit throughout Kashmir. It apparently does not breed further South in the Kuman nor in the Simla and Garbwal Hills, while to the East Osmaston and others have not met with it in Ladak.

It is a familiar bird, breeding in gardens and orchards and in any kind of open well-wooded country. Rarely it may be found breeding in the interior of forest, but this is quite exceptional. Rattray found it common at Thall and Kohat, breeding there freely down to 3,000 feet. Whitehead also found it breeding in the Kurram Valley in colonies in holes in the conglomerate cliffs at the same elevation.

It makes its nest in any kind of hole. Perhaps most often it is in some natural hollow in a tree between 10 and 30 feet from the ground but, very often, it makes use of a hole in the bank of a river. Davidson found eight pairs of birds breeding in holes in the bank of the Jhelum near Baramulla on the 26th June, but in a letter to me he says that "all the nests previously found were in holes in trees." Ward also obtained clutches of eggs "from Kingfishers' and Bee-eaters' burrows in the banks of rivers," though he considered the favourite site to be a hole in a tree of some orchard. Cock says that it was breeding in cliffs about Nowshera and in the Peshawar Valley, as did Whitehead on the Kurram.

The holes selected in trees are nearly always natural ones, and are used as they are found, though occasionally the birds will enlarge an entrance to suit their convenience.

No nest is made, the eggs being deposited on the bare wood or upon any collection of oddments which may have chanced to accumulate in the hole. When laid on sand they often become discoloured, especially when, as is sometimes the case, this is damp.

The breeding season is from the middle of April to the end of June. Rattray says that on the Afghan frontier the birds arrive in the end of April and at once begin hunting round for nesting-holes.

Four to six eggs are laid, pure white and highly glossed, with fine strong texture. In shape they vary from very broad ovals to rather long but blunt ovals.

Forty-eight Kashmir eggs average 36.2×29.0 mm.: maxima 42.1×27.1 and 35.9×30.0 mm.; minima 33.7×30.0 and 34.3×27.0 mm.

In Witherby's 'Practical Handbook' the average of 208 eggs, ¹sumably nearly all from Europe, is 35.4×28.4 mm.

Twenty eggs taken by Pitman in Mesopotamia averaged only 24.9×27.3 mm.

Both sexes incubate, and with the European bird incubation is said to take seventeen days.

Coracias benghalensis.

THE INDIAN ROLLER.

(1517) *Coracias benghalensis benghalensis* Linn.

THE INDIAN ROLLER.

Coracias benghalensis benghalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 224.

The "Blue Jay," as this bird is called by Europeans in India, is found everywhere except in the extreme South of Travancore, from the South to the foot-hills of the Himalayas. East it extends to Bengal West of the Bay and is the form found in Calcutta. In regard to the breeding area, there is no proved overlapping of this race with *affinis*, but in Winter much intermixture certainly occurs. In the Himalayas, from Sikkim Eastwards, the birds are often intermediate between the two, but in Assam they are all true *affinis*, as they are, also, in the districts of Eastern Bengal from Tippera to Chittagong.

Usually I think they make their nests in natural holes in trees standing in open cultivated country and in gardens and villages, but often their nests are placed in holes in old factory walls, niches in mosques and temples, and even in the roofs and walls of inhabited buildings, while occasionally they resort to holes in banks such as deserted holes of Bank-Mynas. Personally I have not noticed that they have any preference for any particular kind of tree, but in

Western Bengal and Bihar, where Mango-groves are to be found everywhere (the older trees with endless convenient holes), most nests may be found in these trees. In South India Rhodes Morgan says that the Tamarind- and Banyan-trees are the favourites. I have records of nests made in Neem, Siris, Shishu, Date- and Coconut-palms, Banyan, Pipul, Casuarina, Acacias of kinds, and many others, while Betham found that in Ferozepore they bred more often in "Ferash"-trees than in any others. I have twice known birds make their nests in verandahs, passing in and out all day practically regardless of the inhabitants. On more than one occasion I have known this Roller to excavate a hole for nesting purposes, but this is only done in exceptionally rotten wood. Aitken, as quoted by Hume, found this one of the hardest nests to locate, and says: "It beats the Lapwing hollow in concealing the whereabouts of its nest." This, however, is certainly not the experience of most observers, who have found the nest with ease. The female sits close, and generally flops out of the hole when one is close by, while the male, when not incubating, generally hangs round the tree or building and gives away the site of the nest.

The nest itself varies greatly. I have seen the eggs deposited on the bare wood or on bare bricks, stones or mortar, while Bingham took a clutch of four in a Myna's nesting-hole in a bank lying on the bare earth. Sometimes a few feathers, leaves, scraps of grass etc. are placed in the hole as a lining for the eggs to lie on and, occasionally, quite a bulky bed of these and other materials is provided.

There does not seem to be any special height selected for nesting purposes, but probably most of the holes chosen are between 10 and 20 feet from the ground.

Over the greater part of its breeding area April to June are the principal breeding months, but in Bihar and Bengal most eggs are laid in March and April, and everywhere a few birds may be found breeding in July. I think some birds breed twice.

The eggs generally number four or rarely five, and are the usual shiny white eggs typical of the family.

Fifty eggs average 34.3×28.1 mm.; maxima 36.0×29.0 and 25.2×29.2 mm.; minima 32.0×28.7 and 33.0×26.0 mm.

Both birds incubate, and the time of incubation appears to be sixteen to eighteen days.

(1518) *Coracias benghalensis indica* Linn.

THE SOUTHERN INDIAN ROLLER.

Coracias benghalensis indica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 226.

This form of "Blue Jay" is restricted to Ceylon and the South of Travancore, where Bourdillon obtained it breeding. Its exact range in Southern India has not been worked out, but it is possible

that Messrs. Kinnear and Whistler may be enabled to do this with the material from the Vernay Expedition.

There is little one can say of the breeding of this race which is in any way different to that of the typical one. It lays its eggs in the same sort of holes and makes the same kind of nest or none at all.

Wait says that the normal clutch is four or five eggs, but all the clutches I have received from Ceylon have been two eggs only, perhaps incomplete. In Travancore Bourdillon obtained four eggs from one nest.

Wait gives the breeding season in Ceylon as January to June, while Bourdillon took the eggs mentioned in Travancore on the 14th April.

Twenty-four eggs, including Wait's, average 35.2×27.7 mm. : maxima 38.4×28.5 and 38.0×29.5 mm' ; minima 31.1×26.6 and 36.9×26.3 mm.

(1519) *Coracias benghalensis affinis* McClell.

THE BURMESE ROLLER.

Coracias benghalensis affinis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 226.

The Burmese Roller extends from Assam and the districts of extreme Eastern Bengal, through the whole of Burma, to South Tenasserim; it also occurs in Siam, Cochin China, Yunnan and Annam. To the West it is the most common form in Bhutan, some birds being intermediate between this and true *benghalensis*; in Sikkim most birds are intermediate, and even in Eastern Nepal here and there one finds a specimen more like the Burmese than the Indian race.

Generally speaking its breeding habits are much the same as those of the other races. It is equally common in the surroundings of villages and towns and even in large gardens and parks. In the wilder parts, however, it occurs commonly in light forest and in all open park-like country, and sometimes even in quite heavy forest, as in the Cachar Hills. It has the same confiding habits, and the nest is equally easy to locate. Two points, however, must be noticed: I have never heard of it breeding in buildings, and it very seldom makes any nest in the hole in which it deposits its eggs. Oates remarks this in reference to eggs taken in Pegu, and Bingham found the same in Tenasserim.

Most eggs are laid in April and early May, but I have seen young some days old in the first week of April and have taken fresh eggs as late as the 28th July. Possibly a few birds which breed in late March and early April have a second brood after the Rains break in June.

This Roller sometimes returns to its nest after the fresh eggs have been robbed and lays again. Once I obtained three eggs on

the 24th April from a tree in Gowhaty, and on my return to that station on the 9th May found four more eggs had been laid.

Thirty eggs average 34.7×27.9 mm. ; maxima 36.9×28.0 and 35.8×29.9 mm. ; minima 31.4×28.0 and 34.5×26.5 mm.

There appears very often to be an interval between the laying of the second and third or third and fourth egg in a clutch, as I have often noticed young which differed considerably in age in the same nest. One nest-hole contained four eggs on the 4th May, the same on the 5th, five on the 6th, and six on the 8th.

Eurystomus orientalis.

THE BROAD-BILLED ROLLER.

(1520) *Eurystomus orientalis orientalis* Linn.

THE BROAD-BILLED ROLLER.

Eurystomus orientalis orientalis, Fauna B. I., Birds, 2nd ed. vol. iv. p. 228.

This handsome Roller has a very wide range. In India it is found in the Himalayas from Kumaon to Eastern Assam, while it also occurs in Ceylon and South-West India from Travancore to the Wynnaad. It extends over the whole of Burma and thence East, all through the Indo-Chinese countries and Yunnan, to Manchuria and Eastern China. South it extends through the Malay Peninsula to Java, Sumatra, Borneo, the Philippines, Celebes and numerous other islands.

It is found in the plains near the mountains, but is most common between 1,000 and 2,500 feet, sometimes wandering up as high as 4,000 feet.

Unlike other Rollers, this bird is one of forests, the damper as well as the dry deciduous ones. I have seen a fair number of nesting sites of this Roller, though in some cases all I have been able to do is watch, note, and then pass on, the trees being unclimbable without the expenditure of much time, often not available. Two examples give a good idea of their favourite breeding haunts. One of the first nests I found was in a hole in an enormous dead tree standing in a patch of rice cultivation on the summit of a hill and surrounded on all sides by forest. The rice-patch was an old one, and the tree, which had been ringed and left standing, had the trunk comparatively sound but many of the limbs rotten and broken away. Some 60 or 70 feet up the trunk I noticed one of the Rollers disappear into a hole and, as I was camping not far away, we determined to have a try at it. Bamboos and canes were growing near by in plenty, so it was merely a question of time and trouble to construct a kind of ladder up to the nest. Eventually bamboos were tied, two by two, to the trunk with green canes until they reached up to

the place where the birds were breeding, a large natural hollow with a rather small entrance. Inside this hollow and about 2 feet from the entrance three eggs lay on a bed of touchwood and chips, no nest of any kind having been made for their reception. Another pair of birds were found breeding in a gigantic *Bombax* in very high forest, standing beside a jungle-path. In the forest close to the tree nothing could be seen of the nest, as it was in a hole in the trunk above the surrounding trees, but we had spotted the birds and their nesting-hole while we were on an adjacent peak. The tree was one of the largest, and certainly the nest-hole was 100 feet from the ground and quite possibly a great deal higher. The nest took us two days to get at, being placed in a hole in a diseased swelling on one of the main great branches, only approachable by means of pegs driven into the trunk and then the branch itself. The pegs were steadied and strengthened by bamboos fastened to their free ends, the whole forming a primitive but very tough ladder. The diseased swelling was about 2 feet or more in diameter, and the whole of the interior had rotted away, leaving a round shell about 4 inches thick, with a small entrance on the underside barely 4 inches across by which the birds obtained access. No nest or lining was in the hole, the three hard-set eggs lying on the bare, very hard wood.

Occasionally holes are selected in rather smaller trees, lower down, yet very seldom under 30 feet. Other accounts of the nidification all agree with mine. Thompson says that in Kuman they are strictly confined to heavy forest and breed in holes in great trees never under 50 feet from the ground. F. W. Bourdillon obtained one clutch of eggs in a tree 40 feet up on the 17th of April and, later, a similar clutch on the 18th of April in a hole even higher up than this. In Burma Hopwood took a clutch of four eggs "very high up in a *Tetrameles nudiflora* tree" and Macdonald one "high up in a Pinkado tree in forest."

The brothers Bourdillon give the breeding season in Travancore as September to May, but T. F. Bourdillon notes in the data on a clutch of eggs given to me that the season is March to May, months which correspond to the season in Assam and Burma.

A very curious fact noted by La Touche about this bird's breeding in China should not be overlooked. He says that he found this Roller breeding freely about Foochow, where they invariably deposited their eggs in Magpies' nests, a habit which is also recorded by David and Oustalet.

The full clutch of eggs is three or four, generally the latter.

Twenty-five eggs average 36.3×28.2 mm. : maxima 36.9×26.1 and 35.0×29.3 mm. ; minima 31.7×25.6 and 32.5×25.3 mm.

Both birds incubate.

The same nest-hole is resorted to year after year, and one such, situated about 100 feet up in an enormous *Simul-tree*, was occupied for about six years in succession.

Family MEROPIDÆ.

(BEE-EATERS.)

All Bee-eaters lay their eggs in chambers at the end of long burrows made by the birds themselves in banks of various kinds, generally of rivers, sometimes elsewhere ; all, also, lay eggs which are pure glossy white, very round, with a fine hard texture but not very thick shell. Most also breed in colonies.

(1522) *Merops apiaster* Linn.

THE EUROPEAN BEE-EATER.

Merops apiaster, Fauna B. I., Birds, 2nd ed. vol. iv, p. 233.

Within Indian limits the European Bee-eater has been found breeding from all over North-West Frontiers, throughout Kashmir to Kuman and Garhwal to the Punjab.

It may be found breeding almost anywhere above 5,000 feet where there is suitable ground for breeding purposes in open country or in river-banks. Normally the birds breed in colonies, often of great size, in some cases a hundred or more pairs collecting together. Occasionally they do not breed in company. Cock, as quoted by Hume, says: "I found them breeding on the hillsides near Gunderbul in June ; they were not in colonies as *M. philippinus*, but two or three nests would occur within a short distance of each other." Buchanan found large colonies near Gunderbal, and Livesey also found colonies near Srinagar. On the other hand, Davidson found "nests singly along the sides of the hill at Gunderbul," while Osmaston also took several single nests near Srinagar.

The depth of the burrow varies according to the soil ; in hard soil such as clay it may be 2 to 4 feet deep, while in soft sandy banks of rivers they may be 6 feet or more. The chamber is large, usually about a foot across and in length and rather less in height. The tunnel is only about 4 to 5 inches in diameter and usually slopes slightly upwards from the entrance.

Undoubtedly most nesting-burrows are made in river-banks, but the birds by no means keep only to these. Burrows have been found on open hill-sides, as stated above, in borrow-pits beside roads, in roadside embankments etc. Hume says that the chamber "at times has a good deal of feather and grass lining." This seems to be quite exceptional but, especially when a nest-hole is used two years running, there is often a mass of the remains of insects, chiefly Hymenoptera, collected in the chamber, due to the chitinous portions of the insects being discarded as the young are being fed.

New nest-holes with only eggs in them rarely have any of these remains or of any kind of grass or feather lining.

The breeding season is very regular, almost all eggs being laid in May and June.

The eggs number five to eight. Hume speaks of the great range in size and variation in shape, but in the hundreds I have seen there has been but little variation in either.

Col. Buchanan took two very remarkable clutches, one of eight and one of five eggs, each containing eggs showing distinct purple-black speckling. In the eight-clutch two eggs have some quite bold spots of purple-black and lavender at the larger end, while one egg has a few lavender specks. In the five-clutch one egg is well marked and one feebly so.

Many years later Col. Ward sent me a large series of eggs taken at the same place near Srinagar, and among these I again found another similarly spotted clutch.

One hundred eggs average 26.6×22.4 mm. : maxima 28.7×23.1 and 26.7×23.8 mm. ; minima 24.1×20.0 and 24.8×19.9 mm.

Witherby gives the average of one hundred European eggs as 25.6×21.8 mm., and remarks that eggs are incubated as laid.

Merops orientalis.

THE GREEN BEE-EATER.

(1523) *Merops orientalis orientalis* Lath.

THE INDIAN GREEN BEE-EATER.

Merops orientalis orientalis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 234.

This Bee-eater is found over practically the whole of Ceylon and India, excluding Sind, Baluchistan and the North-Western Frontier in the North-West and Assam in the North-East. In Ceylon it is said to be found in the hills at an elevation of 1,000 feet only, but in the hills of Southern India it occurs up to about 6,000 feet and in the Himalayas also nearly as high.

It is a bird of open cultivated country and of dry desert-land alike, but is never found in forest and infrequently in heavy wooded land unless these are intersected by wide open spaces. It has no fear of humanity and often breeds in the immediate vicinity of villages and towns.

For breeding purposes rivers with sandy shelving banks are perhaps its favourite resort, but it is by no means confined to these and often makes its nesting burrow in open, almost flat land. Sometimes it breeds in very extraordinary places. In Hume's 'Nests and Eggs' there is a record by Bingham of several birds breeding in the front face of a butt on a rifle-range at Allahabad, where the bullets constantly struck the bank close to their burrows. Butler records one

built in a "mud-bank about a foot high, made to mark the limits of a Badminton Court in the Artillery Mess compound" at Deesa. Often they breed in roadside hanks, banks of borrow-pits, in the sides of ravines and so on. The depth of the tunnel depends on the soil; when this is hard 18 inches to about 3 feet is the usual depth, but in the sandy banks of rivers they may be some 4 to 6 feet. The width of the passage is anything between 2 and $2\frac{1}{2}$ inches but, frequently, this widens a little inside and the egg-chamber is from about 4 to 6 inches in length by rather less in width and not more than 3 to $3\frac{1}{2}$ in height. The tunnels normally run straight into the bank or ground, sloping downwards for the first half of its length. When the birds meet with some opposition, such as a stone or root, they sometimes turn off at right angles and continue the tunnel as far as they deem necessary; often, however, in such circumstances they abandon the tunnel and start afresh. I have seen a pair of Burmese birds make four attempts before succeeding in completing a nest-tunnel. Twice it was stopped by stones within a few inches, once at a depth of about a foot and once by a root only 3 inches from the surface.

The reason for the tunnel being run downwards is obscure, but the habit obtains with all the various races of this Bee-eater. Adam puts the angle of descent at 30° , this being rather steeper than in most of the tunnels I have seen.

There is no nest but when, as occasionally happens, a chamber is used a second year there is always a mass of insect remains, the discarded portions of the food brought in for the previous brood.

The breeding season all over India is from the middle of March to the middle of May, a few birds laying still later in June.

Legge also gives the breeding season in Ceylon as April and May, while he found fledged young in June which had left the nest. Wait, however, found fresh eggs on the 2nd August at Pattalam.

The full clutch may be anything from four to eight, but six is the complete number most often laid.

One hundred eggs average 19.3×17.3 mm.: maxima 21.4×18.0 mm.; minima 17.6×16.0 and 18.8×15.8 mm.

Both birds incubate, but the male much less than the female; both also take part in digging out the nest-hole. The work of digging is carried out by the beak only, but as the sand or earth falls it is thrown out behind by the feet. The action is very vigorous and, when the hole is only a few inches deep, a little cloud of sand is almost continuous behind the working bird.

As with the eggs of other Bee-eaters, incubation often commences with the laying of the first egg, so that the young present a variety of ages. This is accentuated by there sometimes being a gap of a day or two in the laying of the eggs.

The breeding habits of the various races of Green Bee-eater are identical and descriptions are, therefore, not repeated for each one.

(1524) *Merops orientalis birmanus* Neumann.

THE BURMESE GREEN BEE-EATER.

Merops orientalis birmanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 236.

The Burmese race of Green Bee-eater is found from Assam, throughout the whole of Burma into Siam, Yunnan, Cochin China and Annam.

It is, perhaps, found rather more often in colonies, sometimes of considerable size, than is the Indian bird, and it also occurs in country where there is more cover. In Assam we found it numerous in the wide expanses of grass-land, breeding in the banks and slopes of the roads and ravines which traversed them. In the shallow borrow-pits alongside one of the roads single pairs of birds occupied each pit, while on the banks scattered pairs bred, so that in a mile of road there might be a dozen pairs and then for a long way no more. Near Tounghoo in Burma Hopwood noticed birds breeding in the river-banks in colonies of a dozen to twenty or thirty pairs, and at Maymyo Harington also noticed birds breeding in colonies as well as singly.

The breeding season everywhere is April and May and, exceptionally, March.

The full clutch seems to be five more often than six.

Forty eggs average 19.2×17.0 mm. : maxima 20.9×17.9 mm. ; minima 18.1×16.0 mm.

(1525) *Merops orientalis biludschicus* Neumann.

THE SIND GREEN BEE-EATER.

Merops orientalis biludschicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 236.

This rather pale race occurs from South-East Persia to Sind. It breeds in the Mekran as far North as Fao, and may possibly breed in Southern Mesopotamia. It occurs in the Western Punjab, and may breed there also, but has not been proved to do so. It is very common in Sind, nesting in banks of rivers, canals and ravines, sloping ground, and even in flat desert country, though in the latter the tunnels are generally made in the small hillocks. Often the birds breed singly but more often in scattered colonies, individuals having their tunnels 10 to 100 yards apart from one another.

Gonsalves, however, near Sukkur, and Eates on the Hubb River, noticed colonies of some size, the nesting-holes all close together.

The breeding season is March and April, but a few birds breed in May, while Eates has taken eggs as late as the 26th June.

The full number of eggs laid is five or six.

Fifty eggs average 18.8×16.3 mm. : maxima 20.0×17.2 and 19.1×17.4 mm. ; minima 16.6×15.6 and 18.9×15.1 mm.

Merops superciliosus.

THE BLUE-TAILED BEE-EATER.

(1526) *Merops superciliosus javanicus* Horsf.

THE JAVAN BLUE-TAILED BEE-EATER.

Merops superciliosus javanicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 237.

The typical form of this Bee-eater, which was described from Java, is found and is resident over practically the whole of India except the extreme North-West in Sind, Rajputana and the Punjab. It is also found over the whole of Burma, Malay Peninsula, Sumatra, Borneo and Java. It occurs in Ceylon, but according to Wait does not breed there.

This Bee-eater has very curious local movements before and after the breeding season, though the birds are nowhere truly migratory. Thus Betham says that round Ferozepore they arrive in hundreds and thousands during May, and great numbers breed in the mud forts, but that when the breeding season is over they depart. In Bihar the birds are always to be met with, but in the breeding season seem to collect in certain areas and to avoid others. In Lahore, Marshall (C. H. T.) says that the birds are very common in the station during the breeding season but that after it very few remain.

This bird *always*, I think, breeds in colonies, sometimes of very great size. Betham says that they breed in hundreds in the mud walls of the Ferozepore fort. Primrose, Inglis, and I all found them breeding in very large as well as in small colonies in Cachar and Sylhet, and Coltart and Inglis in Bihar found colonies from about a dozen pairs to a hundred or more. In Burma Oates, Bingham, Harington and many others saw vast colonies breeding on the bigger rivers, often in company with Mynas, just as in India colonies of these birds are sometimes found mixed up with colonies of Bank Mynas.

They breed in all the various types of places selected by other Bee-eaters, but undoubtedly keep more to the banks of larger rivers. The nesting-tunnels vary in length, as do those of the rest of the family, but are longer in proportion. When dug in the soft sandy river-banks they are often 6 and 7 feet deep, the tunnels about 3 inches in diameter and the chambers about 8 inches long and 5 high. Even in the hard mud walls of the Ferozepore fort Betham says the nests are deep, mostly 4 or 5 feet.

The birds breed principally in April, a good many in May and a few in June and March.

The usual full clutch of eggs is six, though sevens and fives are not exceptional. I have never seen less than five hard set.

One hundred eggs average 23.2×20.1 mm. : maxima 25.1×19.6 and 22.5×21.3 mm. ; minima 22.0×19.5 and 23.8×18.2 mm.

Both birds assist in making the tunnel and chamber for the eggs and both incubate, the two sexes often sleeping together in the nest-hole.

Nunn's description of the nest of "fine grass and feathers" is probably due to a Bee-eater having taken the burrow of a Bank Myna, though I have never heard of another such instance. The birds, of course, make no nest, laying their eggs on the bare soil or sand.

The young birds in a nest often appear to vary much in age, owing to incubation being started when the first egg is laid.

The birds often return to their old nests, and I have seen one instance in which the whole colony seemed to be using their old nesting-chambers, as in each one opened there was a quantity of insect remains from the previous year.

(1527) *Merops superciliosus persicus* Pall.

THE BLUE-CHEEKED BEE-EATER.

Merops superciliosus persicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 239.

This Bee-eater replaces the Javan bird in Rajputana, Sind and the Punjab, whence it extends North into the Caucasus and Persia.

Doig first found this Bee-eater breeding in Sind. In this district Ticehurst thinks it is only a breeding visitor, but he saw specimens in September, October and November. He says "it breeds here and there probably throughout the canal system in the Province, but not in the very dry South-West corner; Butler noticed it at Hyderabad in July, so that it probably breeds in that neighbourhood, and Doig thought it bred in July and August in the Eastern Narra district, but it certainly breeds much earlier than this. I received a breeding bird from Draklan, near Kashmor, on 10th June, where it was said to be nesting in numbers in the canal banks."

Eates found a colony breeding in the canal banks near Khainju, in the Sukkur district, on the 11th July, many clutches of eggs being still incomplete. In a note sent me with some eggs he says:—"Breeding in small colonies in banks of an old canal near Khainju, Sukkur, Sind. Holes from 3 feet to 5 or 6 feet in length. Full clutch five but most nests contained four eggs and some only three." In Mesopotamia Cheesman and Cox obtained eggs in March, but in Persia Petherick took eggs from April to the end of June, the clutches numbering five to seven eggs, generally six.

One hundred eggs average 26.2×20.9 mm.: maxima 27.1×20.8 and 24.3×22.6 mm.; minima 24.1×21.0 and 26.3×20.0 mm.

The measurements show them to be decidedly larger than the eggs of *javanicus* and considerably less spheroidal.

Melittophagus erythrocephalus.**THE CHESTNUT-HEADED BEE-EATER.**(1528) **Melittophagus erythrocephalus** * **erythrocephalus** (Gmelin).**THE CHESTNUT-HEADED BEE-EATER.***Melittophagus erythrocephalus erythrocephalus*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 240.

This Bee-eater has a very wide distribution, being found from Ceylon to the Himalayas, where it occurs commonly up to 2,500 and exceptionally up to 4,000 feet. In Eastern India it is not found South of the Godaverī but is common in Eastern Bengal and Assam. It is resident over the whole of Burma in suitable localities; the Andamans; South to the Malay Peninsula and East to Yunnan, Annam and the Indo-Chinese countries.

The Chestnut-headed Bee-eater is a bird of forested or of well-wooded open country, and is not one of deserts, sandy wastes or wide cultivated fields, though it does occur in smaller cultivated areas more or less surrounded by forest. It is very common in Ceylon, breeding up to at least 3,000 feet; Davison, and others after him, obtained it breeding in the Nilgiris, while Bourdillon, Stewart and others record it as numerous in Travancore, both here and in the Nilgiris about 4,000 feet being the highest elevations. Davidson found it not rare in the Bombay Presidency. North of this it disappears until the Himalayan Terai is reached, when it once more becomes a very common bird, extending in equal numbers to Eastern Assam and in lessening numbers to Eastern Bengal and Orissa.

I have personally seen so great a number of the breeding-tunnels of these birds that my own experience probably covers all there is to say. The birds undoubtedly prefer the banks of, or sandbanks in and beside, rivers and hill-streams. In these they make their burrows and do not seem to mind whether the banks are vertical, shelving or quite flat. The tunnels are generally long ones; in sandy easy soil they may be up to 7 or 8 feet, and even in comparatively hard soil they run up to 4 feet. The longest I have seen was one of 10 feet in firm sand, ending in a normal chamber of about 6 inches, though in some instances the egg-chamber may measure as much as 8 inches. The diameter of the tunnels is about 2 inches or a little over. When made in vertical banks the tunnels for the first 12 inches to 3 feet grade slowly upwards but, when made in flat sand-banks, they descend fairly steeply until they are some 8 or 9

* *Merops viridis* Linn., 1766, the name hitherto usually given by older writers to the bird now known as *Merops orientalis*, may possibly apply to the young of the present bird. There are, however, certain discrepancies and, under the circumstances, I think it is wiser to discard it as indeterminate and continue the use of *erythrocephalus*, now generally accepted for the present Bee-eater. Robinson applies *viridis* to *sumatranus* of Raffles.

inches below the surface, after which they run parallel with it. There is, of course, no nest of any kind. Many nests in more or less level land get accidentally destroyed, and I have more than once broken through tunnels as I walked along sand-banks, on one occasion actually stepping on the bird on her eggs. Sometimes they breed in small colonies. Davison says that along the "Seegore road leading from the Nilgiris to Mysore; along 5 or 6 miles of this road the banks are drilled with innumerable holes of this species, sometimes 8 or 10 together, at others scattered singly along the sandy banks of the road." In Ceylon Parker says that they breed in small colonies and elsewhere; also they sometimes breed in colonies but, more generally, they breed singly, though many pairs may breed within short distances of one another. In Assam I found that on the big rivers they breed singly but that, when flooded out, as often happens, they then collect and breed in small ravines and forest-streams in colonies of about a dozen pairs.

The breeding season everywhere is April, a few birds laying in March and a few in May; when, however, their eggs or the young birds are destroyed by floods they breed again in late May and even in June.

In Northern India the full clutch is six, but they lay from four to eight, while in Southern India five is perhaps the usual number. In Assam six eggs were laid with curious consistency, certainly in nine cases out of ten.

Two hundred eggs average 21.7×19.0 mm.: maxima 23.4×20.1 mm.; minima 20.1×19.0 and 20.3×17.9 mm.

Both sexes incubate and often the two may be found inside the chamber together. Both, also, assist in digging out tunnel and egg-chamber. They sit very close and generally refuse to move before they are actually touched.

(1529) *Alcemerops** *athertoni* (Jard. & Selby).

THE BLUE-BEARDED BEE-EATER.

Bucia athertoni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 242.

Alcemerops athertoni, *ibid.* vol. viii, p. 077.

This fine Bee-eater occurs in the Lower Himalayas from Kumaon to Eastern Assam, extreme Eastern Bengal and the whole of hill Burma to Tenasserim. East it is found in Siam. It also occurs on the South-West coast of India from Travancore to Belgaum and in Sambalpur.

This is entirely a forest bird, often frequenting very deep forest of lofty trees, at all elevations from the foot-hills up to some 5,000 feet.

The only correct account of its breeding recorded in Hume's 'Nests and Eggs' is that of Bingham, who describes the capture

* *Alcemerops* I. Geoff. St.-Hilaire, Nouv. Ann. Mus. Hist. Nat. Paris, vol. i, p. 395, 1832 (pub. August 1833), antedates *Bucia* Hodgs. J. A. S. B. vol. v, p. 360, 1866, and must therefore be used.



of a female bird on its four eggs, laid in a chamber at the end of a 7-foot tunnel cut in a sandy bank of the Meplay stream.

Whymper obtained eggs in the Kuman and Nepal Terai from very deep burrows, 7 or 8 feet, cut in the sandy banks of ravines in forest.

In the Southern Assam hills the birds were comparatively common and we found many nests. The ones occupied were, however, not easy to locate, as the birds seem to employ their spare time in digging unnecessary tunnels which are deserted as soon as dug. Their favourite nesting sites in these hills were the banks of the jungle-tracks leading through tree-forest, and it was rarely we found one in the banks of small streams or ravines. They breed singly, and never in colonies, but within a space of a very few yards I have seen as many as a dozen or twenty burrows, all but one of which were nothing but the result of wasted energy. No nest is made but, even before the eggs are laid, the birds sleep in the nest and take much of their insect-food into it for consumption. The cock bird also seems to feed the hen a great deal when she is sitting. The consequence is that by the time the full clutch of eggs is laid there is a considerable collection of insect debris. We found the easiest way to ascertain if the nest was in use was to insert a long wand with a splayed tip, twist it about and then pull it out again. When there were eggs the wand would disturb the bird if sitting and, if not, it would pull out the insect remains.

The tunnels are very long, seldom less than 5 feet and often 6 to 8, while in diameter they are about $3\frac{1}{4}$ or $3\frac{3}{4}$ inches. The chamber is about 8 inches wide and long and about 5 inches high.

The breeding season is April and May, but I have taken eggs from February to August, while Davidson obtained a clutch in Kanara in March.

The full clutch is almost invariably six, rarely five only, and when I have opened tunnels with young there always seemed to be six of them.

Fifty eggs average 30.0×28.0 mm.: maxima 32.9×27.8 and 32.3×29.0 mm.; minima 28.5×26.3 and 29.0×25.4 mm.

Both sexes incubate, both work on the burrow, and often both stay in the nest together. They sit very close and will sometimes refuse to move until lifted off their eggs.

(1530) *Alcemerops amictus* (Temm.).

THE RED-BEARDED BEE-EATER.

Bucia amicta, Fauna B. I., Birds, 2nd ed. vol. iv, p. 243.

Alcemerops amictus, ibid. vol. viii, p. 677.

This beautiful Bee-eater ranges from Tenasserim, through the Malay States, to Sumatra and Borneo. It also occurs in peninsular Siam.

Like the preceding bird, this is a forest species, being found from the foot-hills up to some 4,000 or even 5,000 feet.

So far as is known its breeding habits are quite similar to those of the Blue-bearded Bee-eater. Kelsall obtained two eggs from a chamber at the end of a tunnel dug in a sandy bank at Kota Klanggi, Pahang, in August. Kellow, however, found three nesting tunnels near Taiping between the 7th and 19th February containing five, three and five eggs, all of which were in hurrows, about 4 feet deep, dug in the stiff soil of small streams running through dense forest. A female was caught on one nest and a male on another so, evidently, both sexes incubate.

Thirteen eggs average 28.8×24.9 mm. : maxima 30.5×26.3 and 29.0×27.0 mm. ; minima 28.0×23.6 and 28.9×23.2 mm.

Family ALCEDINIDÆ.

(KINGFISHERS.)

Kingfishers all lay pure white eggs exactly like those of the Bee-eaters and only varying in size according to the species laying them. Like the Bee-eaters also they lay them in chambers at the end of tunnels dug in the banks of rivers etc. or, occasionally, in trees or termites' mounds. There is no nest but, sometimes, there is a mass of undigested fish-bones upon which the eggs are deposited, or which gradually pile up round them as incubation advances.

Ceryle rudis Linn.

THE PIED KINGFISHER.

(1531) *Ceryle rudis leucomelanura* Reichenb.

THE INDIAN PIED KINGFISHER.

Ceryle rudis leucomelanura, Fauna B. I., Birds, 2nd ed. vol. iv, p. 246.

This, the best known and widest spread of all our Indian Kingfishers, is found over the whole of Ceylon, India and Burma in suitable places with sufficient water supply. In Burma it is found as far South as Amherst, while in the East it extends through the Indo-Chinese countries to Yunnan and South China.

It is a plains bird but ascends the hills of Southern India and those of Chota Nagpur etc. up to about 2,500 feet, while I have also found them at this same elevation in the sub-Himalayas.

It is essentially, for breeding purposes, a bird of rivers in open country, cultivated or wild. I have found them breeding in the larger, more open streams running through forest in the submontane

tracts, but they were rare in such places. Whymper also obtained them on the rivers of Kuman in somewhat similar country.

Of Hume's many correspondents no one reported to him any tunnels other than those made in river-banks, these nearly always being from 1 to 5 feet above the water and, as Hume notes, nearly always in positions only to be approached in a boat. In Dacca, Mymensingh and Noakhali, however, I found birds burrowing into banks of tanks, in Dacca commonly, in the other districts occasionally.

The nest-hole varies somewhat; in hard soil it may be no more than 12 inches deep, while in sandy soil it runs up to about 4 feet. Adam records one seen by him in the banks of the Jumna as 7 feet deep, but such, I think, is quite exceptional. The entrance is from 2 inches wide (Brooks) to nearly 3; generally, I think, it is fully 2½. The chamber measures about 6 by 6 to 8 by 8 inches and, as usual with tunnelling birds, is not so high in proportion, more often under than over 5 inches.

There is no nest in the true sense of the word but, sometimes, there is an accumulation of the undigested remnants of fishes. Some birds, in fact, feed inside their burrows, while other individuals do not, and the latter are more numerous than the former.

Aitken gives such a charming little account of this Kingfisher's habits that, in spite of its length, I feel it should be quoted. He writes:—"At Akola, Berar, my brother took two out of six eggs from a Pied Kingfisher's nest in a river-bank. Although the hole was much dug away the birds continued to sit upon the remaining four eggs, which were duly hatched, and soon after the young were fledged the parent birds took possession of another hole near the first. That bank seemed to be their regular breeding place and was full of holes. Six eggs were again laid, and six young birds appeared in due time perched all in a row upon the top of the bank. Nearly a mile down the river was a *bund*, and here, of course, it was easier to catch fish than at the nest where the water was running. So from early morning till late at night the parent birds continued making trips to get food for their young. Each little fish that was caught cost a flight to the bund and back of not much less than two miles, and the voracious fledglings seemed never to be satisfied. As soon therefore as the latter were able to go the distance, they were conducted to the bund, where they could be fed with less trouble to the old birds and, I don't doubt, with more satisfaction to themselves. This arrangement was continued for several weeks, the whole repairing to the bund every morning, and flying back to the nest in the evening. I regret I never took the trouble to watch whether they got into the hole to sleep."

I think we can say with certainty they did, as this is the usual custom with most Kingfishers.

The breeding season is, roughly speaking, November to March, *i. e.*, after the Rains have ceased sufficiently long for the rivers

to fall and expose their banks and before they rise enough to flood the nest-holes. Most birds breed from December to February but, on the other hand, some start in October. Blewitt informed Hume that about Raipur they bred from February to the middle of April, and Marshall found the same in Saharunpore, while Davidson and Wenden say that in the Deccan they breed all the year round except in "the very hot months," presumably June to August.

Marshall has the following note on this bird's breeding:—"I have noticed a curious fact about this bird; it is a gregarious breeder. I have taken three sets of eggs from the same hole; the hole led to a large open sort of cavern, about 3 feet across, which was plentifully strewn with grass and rubbish, and the eggs were in different corners of it."

The eggs number four to six, generally five.

One hundred eggs average 29.9×21.4 mm.; maxima 32.0×24.0 and 30.2×25.1 mm.; minima 27.9×23.8 and 30.9×23.0 mm.

Both sexes incubate and take a share in making tunnel and chamber, but I can find nothing recorded as to the period of incubation. I think it is fifteen days, but I am not sure. The fledgling time is from four to five weeks.

Ceryle lugubris (Temm.).

THE GREAT PIED KINGFISHER.

(1532) *Ceryle lugubris guttulata* Stejneger.

THE HIMALAYAN GREAT PIED KINGFISHER.

Ceryle lugubris guttulata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 248.

This fine Kingfisher is found in the lower hills of the Himalayas from Kashmir to Assam and over the whole of the Burmese hills as far South as Amherst in Tenasserim. Forrest also obtained it in Yunnan. It is most common between 1,000 and 2,000 feet in Assam, where it is seldom seen over 3,000, but in the Western Himalayas it is common up to about 3,000 feet and has been recorded up to 7,000 feet.

This Kingfisher breeds in the banks of streams running through forest and always where the water is flowing bright and clear, in rapids and pools, but not in a rushing torrent. Stagnant and discoloured water is avoided altogether, and I have never seen it about forest pools and swamps. Hume found a brood of young birds in a hole in the bank of a stream near Subatoo, and this, with the exception of my own account of its breeding, is the only note in 'Nests and Eggs,' as Thompson's note is valueless.

Rattray once took a clutch of four eggs near Mussoorie on the 15th May. This also was in a large chamber at the end of a very short tunnel, similar to that found by Hume and others found by

myself. Whympcr, however, who has had greater success with this bird than anybody else, finding several nesting tunnels in the high gravelly banks of the Gola and Kosi streams in the Kuman below Naini Tal between 1,500 and 2,000 feet, describes the tunnels as long. In one he says that the tunnel was 8 feet long and in others about 6 feet, although the soil was not exceptionally easy to work. They were all placed fairly high up in the banks, as were those Rattray and I found, and all the tunnels graded upwards towards the chamber, which was very large, measuring a foot or over each way and about 8 or 9 inches high. The tunnel entrance is over 4 inches wide.

The eggs found by me, four in number, were lying on a mass of fish-bones, exceedingly malodorous and, quite possibly, the remains of the food supplied to a previous brood of young. Neither Rattray nor Whympcr found any bones in the egg-chamber, and it seems certain that these merely accumulate as the young are fed and throw up the undigested portions.

The breeding season is undoubtedly March and April. Whympcr obtained all his in these months, and Rattray's eggs taken on the 15th May and mine in June were no doubt second layings.

The full clutch is four or five, but the young seem to come to grief early, as one seldom sees more than two young birds with the old ones.

Twenty eggs average 38.5×32.5 mm. : maxima 39.4×31.0 and 39.0×35.0 mm. ; minima 37.3×30.1 mm.

There is nothing on record as to which sex incubates or digs out the nesting hole.

The Cacharis informed me that this bird sometimes bred inside forests, making the nest-holes in banks, but I have never seen such. On the other hand, I have seen one nest-hole in the bank of a ravine just where it debouched into the stream itself.

Alcedo atthis (Linn.).

THE COMMON KINGFISHER.

(1533) *Alcedo atthis bengalensis* Gmelin.

THE COMMON INDIAN KINGFISHER.

Alcedo atthis bengalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 250.

This beautiful little relation of our English Kingfisher is found over the greater part of Northern India ; from Sind on the West to Assam on the East ; from Nepal and Lower Sikkim in the North to the North-East Central Provinces and possibly the extreme Northern Deccan in the South. The birds of the outer ranges of the Kuman and Garhwal Terai seem also to be of this race.

As a rule this little Kingfisher prefers to make its nesting burrows on the banks of rivers and streams running through open country,

cultivated, barren, or partly one and partly the other. I have, however, often taken the nests from the banks of streams running through forest and, also, more than once, in the sides of big tanks. A pair of birds in *Dacca* built in the stiff soil of a tank just outside my bungalow for three years in succession, each time making a fresh tunnel in the same face of the tank. They seem to breed at all heights from the plains up to about 5,000 feet. Osmaston found them breeding in Garhwal up to 4,000; Whympers took the eggs in Kuman at 3,000 feet, while in the South Assam hills they are common up to about 5,000 feet or as high as the streams afford suitable banks for breeding in.

The tunnels are not as a rule very long, though varying somewhat according to the soil. I have seen one as much as 6 feet long in firm sand, but anything over 4 feet is exceptional, while often they only run from 1 to 2 feet. The diameter of the entrance is about 2 inches, or less and the size of the chamber 5 or 6 inches long by nearly as much in width. The height is not more than 3 inches. In most nest-holes the tunnels rise gradually, sometimes throughout their length, sometimes for part of the way only.

The collection of fish-bones so commonly found in the egg-chamber of the English bird is exceptional in this race. I have never seen it when the eggs were fresh, unless they were a second lot of eggs laid in a preoccupied nest. As incubation advances, and the hen is fed on the nest by the male, bones begin to accumulate, and these, of course, accumulate still faster when the young are hatched.

Over the greater part of the plains the birds breed in March and April, though odd nests may be found in Bengal in December and January. In the hills, where floods do not constitute the same danger as in the plains, most birds breed in May and June.

In India the normal clutch is six eggs, five and seven being quite common.

Forty eggs average 20.9×17.6 mm.: maxima 22.4×17.3 and 22.0×19.0 mm.; minima 19.9×17.0 mm.

I have never been able to determine when the last egg of a clutch was laid and so fix the period of incubation. According to Witherby the fledgling period of the English bird is twenty-four days, and that of our bird would be the same or less. Both birds perform the duty of incubation as well as that of tunnelling.

(1534) *Alcedo atthis taprobana* Kleins.

THE COMMON CEYLON KINGFISHER.

Alcedo atthis taprobana, Fauna B. I., Birds, 2nd ed. vol. iv, p. 252.

This Southern race is found in Ceylon and in Southern India as far North as Bombay City, Poona, Mt. Abo, the Southern Deccan and extreme South of Orissa. In the central portions the

birds merge into one another, some being nearer *laprobana* and some nearer *bengalensis*.

In its breeding habits generally this bird does not differ from the preceding, but it is more of a forest bird, while it has been found breeding in the great Ceylon tanks surrounded by mighty forest and far from open, running water. Phillips also found it making its nest-hole in the bank of a small pit, 100 yards from a stream. A still more curious site is recorded by Davison, who says:—"I once found what may have been intended for a nest in Madras towards the latter end of January, in a well; what I supposed to be a nest was placed in a hole in the masonry lining of the well, and round the entrance of the hole was accumulated a rather large quantity of small partially decayed fish and fish-bones; but these had been placed there not apparently as a lining, but with the object of keeping the eggs in the hole, as it had a perfectly flat floor. I should, however, add that though the bird was in the hole, it contained no eggs, and *may* therefore have been only a resting place."

The accumulation of bones seems to be more frequent with this race than with most. Bruce at Ahmednagar found a layer of fish-bones in two nests examined by him. Davison and Darling also refer to similar layers of fish-bones as being found by them in nest-holes containing fresh eggs.

The tunnels are of no great length; most are between 2 and 4 feet, many less, few more. The diameter of the tunnel is from $1\frac{3}{4}$ to 2 inches and the chamber about 4 by 5 or a little bigger.

Over most of Southern India March and April are the two chief breeding months, but Davidson and Wenden took eggs at Satara in June, while the former and Butler obtained several nests at Belgaum in August and September containing fresh or hard-set eggs. I have also eggs taken by Barnes at Satpura in February.

In Ceylon they breed practically all the year round. Wait, Phillips and others between them have taken eggs in each month January to June, and again in each month October to December.

Five is the number of eggs most often laid, but Butler took a clutch of seven near Belgaum, and four only are sometimes incubated.

Forty-eight eggs average 20.4×17.2 mm.: maxima 21.6×17.9 and 20.6×18.4 mm.; minima 19.1×15.8 mm.

(1535) *Alcedo atthis pallasii* Reichenb.

THE COMMON CENTRAL ASIAN KINGFISHER.

Alcedo atthis pallasii, Fauna B. I., Birds, 2nd ed. vol. iv, p. 253.

Within our area this is the race of *A. atthis* which occurs as a breeding bird in Kashmir to Gilgit and the Afghan and Baluchistan frontiers. It also certainly breeds in the higher valleys of Garhwal. Osmaston records it from Ladak, once at 10,000 and once at 12,000 feet, on a small stream above Leh. From Gyantse Ludlow records

a specimen of *A. a. bengalensis*, but a very poor skin sent me by Macdonald I put down as *pallasii*, and I think Ludlow's must be the same.

Nests and eggs taken between 4,000 and 6,000 feet must be considered doubtful unless the skins are available for examination, as the Indian and Central Asian forms meet in this area and grade into one another. Meinertzhagen says that the form occurring in Quetta is of this race and those of the Kuman Valley are also the same. Sometimes it breeds at great altitudes, but I have not any definite record of nests and eggs at more than 12,500 feet.

As regards its nidification there is nothing special to record. It seems to keep almost exclusively to the banks of streams for burrowing purposes and principally to those in open country.

The breeding season is April and May at the lower levels and May and June at the higher.

Five to seven or, exceptionally, eight eggs are laid.

Forty of these average 21.1×17.8 mm.: maxima 22.5×18.0 and 19.5×18.4 mm.; minima 19.5×18.4 and 20.2×17.1 mm.

Alcedo meninting Horsf.

THE BLUE-EARED KINGFISHER.

(1536) **Alcedo meninting verreauxi de la Berge.**

THE MALAY BLUE-EARED KINGFISHER.

Alcedo meninting meninting, Fauna B. I., Birds, 2nd ed. vol. iv, p. 254.

Alcedo meninting verreauxi, ibid. vol. viii, p. 677.

Within our limits this little Kingfisher only occurs in the South of Tenasserim, though two or three specimens from Bakkasoon seem also referable to this race. It extends through the Malay Peninsula to Borneo.

The Kingfishers of this group are far more birds of forest than those of the preceding one. As a rule they keep to small streams over which the higher trees interlace their branches and the sun merely glints here and there through the deep shade. Sometimes they resort to deep ravines, provided these have water running through them, for it is a true fisher of fish, and the water must suffice to hold some tiny forms of their proper food. Open stretches of stream they never breed in so far as I am aware, and when they traverse them in passing from one stretch of forest to another it is always at full speed.

Robinson says (Birds of Malay Penin. vol. i, p. 96, 1927):—“Nesting habits much as in *A. a. bengalensis*, and eggs as in that species. Four obtained by Sir Hugh Low in Labuan average 0.76 by 0.65 in. In the Malay Peninsula, at any rate in the North, the nesting season is about June.”

Kellow sent me three clutches of eggs said to be of this bird—one of three eggs dated 15. v. 08, a second of three dated 29. iii. 09

and a third of two eggs taken on 14. ii. 1911. With this last clutch the skin was sent of a bird caught on the eggs, so they are doubtless authentic, and measure 20.0×17.0 and 19.7×16.9 mm. The other clutches average about 21.8×19.4 mm., and appear to be too big for this little bird.

The tunnel from which the two eggs were taken was about 2 feet deep and was cut in a rather muddy bank of a small stream in deep forest.

(1537) *Alcedo meninting phillipsi* Stuart Baker.

THE CEYLON BLUE-EARED KINGFISHER.

Alcedo meninting phillipsi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 255.

So far this race of Blue-eared Kingfisher has only been obtained in Ceylon, South Travancore and Pottianore in Madras.

Its habits are those of the species, but the only eggs I know of are a beautiful clutch of six taken by J. Stewart in South Travancore and given to me.

The six vary in length from 20.2 to 21.3 mm. and in breadth from 17.0 to 17.2 mm., and average 20.7×17.1 mm.

They were taken on the 17th January from a hole in a bank of a small stream running through forest at an altitude of about 2,000 feet.

(1538) *Alcedo meninting scintillans* Stuart Baker.

THE TENASSERIM BLUE-EARED KINGFISHER.

Alcedo meninting scintillans, Fauna B. I., Birds, 2nd ed. vol. iv, p. 255.

This race occurs in Burma, North of the true *meninting* and South of *coltarti*.

It is the same forest bird as the other races and probably has the same breeding habits, but there is very little on record.

Oates obtained it breeding in Pegu, and notes:—"July 2nd: nest in the steep bank of a ravine in thick forest. Gallery about one and a half feet long, terminating in a small chamber. Eggs four, laid on the bare soil. July 14th: nest with nearly full-grown young in similar situation."

Hopwood obtained a nest with three eggs near Tharrawaddy on the 15th April, the nest-hole being dug in the bank of a stream in dense forest running into the Tharrawaddy River. These eggs are very large, averaging about 22.9×19.4 , and if not abnormal there may be some mistake in the identification, as at that time the differences between the various small Blue Kingfishers were little understood.

Mackenzie also obtained Blue-eared Kingfishers breeding near Prome and took two clutches, each containing four eggs, on the 9th April. These average only 18.8×16.5 mm., much smaller than any races of the *atthis* group, and are probably correct.

(1540) *Alcedo meninting coltarti* Stuart Baker.

THE ASSAM BLUE-EARED KINGFISHER.

Alcedo meninting coltarti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 256.

The Assam Blue-eared Kingfisher extends from Sikkim on the West to the hills of Northern Burma on the West and about as far South as latitude 10° in Burma and about the same in Siam and thence into Cochin China.

It occurs from the plains and foot-hills up to about 6,000 feet and is, perhaps, most common at 2,000 to 3,000 feet.

There is nothing on record about the breeding of this bird, but I found many nests in North Cachar and the Khasia Hills and, later, Coltart also obtained it in Lakhimpur.

It is a bird of forest of any description and also of bamboo-jungle, but seems to keep almost entirely to deep gloomy ravines with steep broken sides and plenty of bush and tree cover. The actual nest-holes are, of course, drilled in the banks where they are more or less free from roots, but I have seen bushes overhanging the entrances, and one tunnel I saw was cut into the face of a mossy bank, the moss having to be cut through or pulled out before the work of excavation could be started. The first nest-hole I ever found was in a deep, precipitous gorge running through bamboo-jungle, the sides thinly clad with bushes and small trees. About 5 feet below the overhanging top and nearly 50 from the stream at the bottom a great rock jutted out and attracted my attention. As I looked at it a tiny Kingfisher flew out from under it and, on climbing up, I found the entrance located a few inches below the rock. The bird soon returned and was caught in the noose which had been set for it. The tunnel, barely 2 inches wide, proved to be some 24 inches deep, with a small chamber at the end measuring about 5 inches either way, and here reposed seven eggs on the bare earth. This tunnel was bored in mixed clay and loam, but in sandy soil the galleries may run up to 4 or 5 feet and even 6 feet in length. I have found small amounts of fish- and insect-remains both in the tunnels and chambers and, occasionally, a good many in the latter, on one occasion two good handfuls being around and under the six eggs.

The principal breeding months are May and June, but I have eggs in my collection taken by myself from the 14th April to the 7th August, and I think many birds breed twice.

The eggs number four to eight, but the smaller numbers may be incomplete clutches.

Fifty eggs average 20.3×17.6 mm.: maxima 21.7×18.0 mm.; minima 19.2×17.3 and 20.0×15.3 mm.

(1541) *Alcedo meninting rufigaster* Walden.

THE ANDAMAN BLUE-EARED KINGFISHER.

Alcedo meninting rufigaster, Fauna B. I., Birds, 2nd ed. vol. iv, p. 257.

This bird is restricted to the Andamans, where it is very common and where Osmaston obtained a fine series of its eggs.

The birds made their nesting tunnels both in the banks of the freshwater streams and in those of the tidal creeks, often where there were quite dense forests on either side.

The tunnels were about 3 feet in length and appear never to have held remains of fish or insects.

The breeding season is very late, as all Osmaston's eggs were taken between 13th June and 8th July.

Forty eggs average 20.3×17.6 mm. : maxima 21.5×18.3 mm. ; minima 18.8×16.9 and 20.9×16.8 mm.

(1542) *Alcedo hercules* * (Laubmann).

THE GREAT BLUE KINGFISHER.

Alcedo hercules, Fauna B. I., Birds, 2nd ed. vol. iv, p. 258.

This grand Kingfisher occurs in the Lower Himalayas from Sikkim to Eastern Assam, Manipur and the Chin Hills. It has also been recorded from Hainan.

In 'Nests and Eggs' there is a copy of an article of mine on the breeding of this Kingfisher, but since that paper was written I have seen many more nesting-holes, while later Coltart also obtained more than one clutch of its eggs.

Over the greater part of its range it is most often to be met with between 2,000 and 3,000 feet, but in Lakhimpur we found it in the foot-hills and plains at 700 to 1,000 feet as well as higher up, while in Cachar we met with it fairly often up to 4,000 feet.

It keeps almost entirely to deep shady ravines and small water-courses in tree-forest and, as it is a very silent bird, one sees or hears little of it. Sometimes a dark shadow flits rapidly past one in the gloom, suddenly turning to a gleam of brilliant blue as it glints in some splash of sunlight and then, as suddenly, it is gone again from sight and sound. All the nest-holes I have found, with one exception, were dug in banks of ravines, sometimes almost waterless, or in the sides of tiny rivulets in dense forest. In most of these the ground was rather hard, the nest-holes being only 18 inches or 2 feet deep, ending in a chamber for the eggs between 6 to 8 inches either way and about 4 to 5 in height. The entrance tunnel was about 3 inches in diameter. When in light soils the

* *Alcedo hercules* of Laubmann is 1917, while *megalia* of Oberholser is 1910, two years later, and cannot be used.

tunnels were much deeper, and one made in the sandy bank of a small stream went a full 6 feet into the bank. The tunnels all sloped slightly upwards at first and then dropped again near the egg-chamber.

The one exception referred to above was a tunnel dug in the bank of a small stream which for about 100 yards or less ran through an open piece of cultivation surrounded by forest. This nest was on the South or shady side of the stream and the entrance was tucked well away under an overhanging bank.

A similar nest to this last was taken by Coltart near Margherita, but this was even more in the open, no forest being within 200 yards of the nest.

Most nest-holes have a very considerable amount of insect- and other ejected food-remains in the egg-chamber, and often scattered along the tunnel as well, smelling very vilely and so strongly that I have noticed the smell once or twice before opening out the nest.

The birds breed principally in April and May, and I have personally taken eggs from the 27th March to the 3rd June.

The number of eggs laid is four to six; probably the latter is the usual full clutch, but I have taken four showing signs of incubation.

Forty-five eggs average 26.1×21.7 mm.: maxima 28.1×23.0 mm.; minima 24.8×20.6 and 24.9×19.8 mm.

They, perhaps, average rather longer in proportion to their size than do most Kingfishers' eggs.

The birds sit very close and, when once one has located the nest-hole and watched the bird on to it, it is easy to catch it by hand. Both birds incubate, for we have caught both on the eggs, but I know nothing about the excavation of the nest-hole.

(1543) *Alcedo euryzona* Temm.

THE BROAD-ZONED KINGFISHER.

Alcedo euryzona, Fauna B. I., Birds, 2nd ed. vol. iv, p. 259.

The range of this species extends from Mt. Muleyit in Tenasserim, through peninsular Siam and the Malay States, to Sumatra, Borneo and Java.

It seems to be a rare bird everywhere, and even where found to keep to ravines and broken country from the foot-hills up to about 4,000 feet. In consequence there is practically nothing on record as to its general habits and nidification.

The only person to take its eggs is W. A. T. Kellow, who took two sets of four and five respectively on the 2nd and 5th January, 1908. These were both taken from nest-holes cut in the banks of small streams running through dense tree-forest at an elevation between 1,500 and 2,000 feet. The eggs were laid on the bare sandy soil, the female being caught in one of the nest-holes and sent to me for identification.

Ceyx erythaca.**THE THREE-TOED KINGFISHER.**(1544) **Ceyx erythaca erythaca** (Linn.).**THE INDIAN THREE-TOED KINGFISHER.***Ceyx tridactylus tridactylus*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 260.*Ceyx erythaca* * Linn., Syst. Nat. 1758, p. 115 (Bengal).

This beautiful little Kingfisher occurs in Ceylon and the South-West of India as far North as Kanara, while it has also been obtained in the Sahyadri forests near Bombay. It is then again found in the sub-Himalayas from Nepal and Sikkim to Eastern Assam, extending into the foot-hills and adjacent plains. It is found over the whole of Burma and the Malay Peninsula to Sumatra and the Philippines, while to the East it is found in Siam and Cochinchina to Hainan.

In most of its area it ascends the hills as high as 4,000 feet, but is more common between 2,000 and 3,000. It is a bird of ravines and rocky broken ground in evergreen forest, generally haunting those in which there is some running water. At other times it may be found on streams, some even of considerable size and quite free from overshadowing trees. On the whole, however, it prefers to live and breed in deep shade, being often found far from water of any kind.

The tunnel may be dug in almost any upright bank or the side of a stream or ravine. I have seen it made in the face of a vertical mossy bank, broken with rocks and with a trickle of water down the centre; often I have found it in the sides of ravines, drilled in some bare spot where there is no vegetation; once or twice I have found it in a bank overgrown with ferns and balsams and no water anywhere near and, once only, I saw a pair of birds busy excavating their nest-hole in the bank of a stream fully 50 yards across and with high sandy sides. The tunnel is usually short, not more than 2 feet 6 inches or 3 feet, the width from $1\frac{1}{2}$ to $2\frac{1}{2}$ inches and generally under 2 inches. The chamber is big for the size of the bird and measures some 5 to 6 inches either way, with a height of 2 to $2\frac{1}{2}$ inches. I have never seen a great mass of fish-bones or insect-remains, though a few may be seen sometimes both in the chamber and in the tunnel, nor have I ever noticed any stenches from the few I have seen.

The birds work at a great pace in soft sand, digging furiously with their beaks and throwing out the sand behind them with their feet. The two birds I watched in the stream had not got more than 2 inches into the bank when I arrived, but when I examined

* This name antedates that of *Alcedo tridactyla* Pall., 1809.

it forty minutes later it was about 10 inches deep. This sand was soft yet wet, and so particularly easy both to loosen and to throw out.

On two or three occasions I have seen scraps of moss in the egg-chamber, but these are, I feel sure, only accidental, as they may appear on the floor of the tunnel just as often as in the chamber.

In Assam this little bird breeds in April and May and, then, sometimes again in July and August and, curiously enough, it seems to select the same months in Ceylon.

The eggs number four or five, occasionally six or even seven. They are quite typical except in their shape, which is longer and more oval than is usual in this family, a few eggs such as those taken by Parker in Ceylon being almost pointed at the small end.

Thirty eggs average 18.9×15.6 mm. : maxima 20.0×16.4 mm. ; minima 18.0×15.5 mm.

(1546) *Ramphaleyon amauroptera* (Pearson).

THE BROWN-WINGED KINGFISHER.

Ramphaleyon amauroptera, Fauna B. I., Birds, 2nd ed. vol. iv, p. 263.

This large Kingfisher has been recorded from Eastern Bengal and South Assam, and from Arakan, Pegu and Tenasserim in Burma, and again from South Siam.

It is normally a coastal bird, being only found far inland, when it follows the course of the great tidal rivers, the creeks and small intersecting cuttings of which form its favourite resort. In Burma, where the great rivers soon change their muddy, slow-moving character for clear, swiftly-flowing streams, this Kingfisher is almost confined to the coastal mangrove-swamps, but in the alluvial districts of Eastern Bengal it is found on the Megna and other great tidal rivers far from their mouths, and is not rare even in Sylhet and Cachar.

Nothing is recorded of its nidification, but I have twice seen it breeding in Assam, once taking a clutch of four eggs to which the bird returned several times, only leaving the tunnel again when we were within inches of the entrance. The bird, however, was seen so close and so often that there can have been no mistake as to the identification. The entrance to the tunnel was just under the top of a high bank of a muddy creek off the Barak River, and so high, about 16 feet, that it was above the level of all but an abnormal flood. The soil was hard and like clay, the tunnel being only about a foot long and about 4 inches wide, but the chamber was large, measuring about 8 inches either way and nearly 3 inches in height. It was found on the 11th April and contained four eggs.

The second nest was found in a muddy little stream in the Maha Valley and contained two young and two addled eggs. This nest was out of the plains area of *amauroptera*, and I took it for granted that the Stork-billed Kingfisher which flew from it was a specimen

of *gural*; when, however, I saw the young birds they proved to be of this species.

The nest was exactly like the first found but deeper, being about 2 feet in length. This was taken on the 27th April but, judging from the young ones, the two addled eggs must have been laid in the middle or beginning of March.

The six eggs vary from 31.8×21.8 mm., almost certainly an abnormally small egg, to 36.0×30.2 mm.

Ramphalcyon capensis (Linn.).

THE STORK-BILLED KINGFISHER.

(1547) *Ramphalcyon capensis intermedia* (Hume).

THE NICOBAR STORK-BILLED KINGFISHER.

Ramphalcyon capensis intermedia, Fauna B. I., Birds, 2nd ed. vol. iv, p. 264.

This Kingfisher is restricted to the Nicobars, where it frequents the coast and adjoining forest.

There is nothing on record about its breeding, but Vidal had a single egg given to him by Davison which had been taken on the 21st April in Car Nicobar. This egg, now in my collection, measures 38.0×30.4 mm.

(1548) *Ramphalcyon capensis gural* (Pearson).

THE BROWN-HEADED STORK-BILLED KINGFISHER.

Ramphalcyon capensis gural, Fauna B. I., Birds, 2nd ed. vol. iv, p. 265.

This Kingfisher is found in Ceylon and all India wherever there are tracts with ample water-supply and well wooded. It keeps almost entirely to shady ravines, small sluggish streams and deep ditches, and where these are together with the necessary cover there also will this bird be obtained.

Stewart and Bourdillon say that in Travancore it is common at low elevations on small streams in dense forest; Whympcr found it breeding in similar places in the Kuman Terai from the foot-hills up to some 2,000 feet, while I again obtained nests at about the same elevation in well-wooded streams in North Cachar.

The nest is nearly always a chamber at the end of quite a short tunnel dug out in the bank of some small ravine. Those I have seen have been from 2 to 3 feet long. Stewart and Bourdillon also say it runs about 2 or 3 feet, and Whympcr again gives the same. The tunnel is $3\frac{1}{4}$ to 4 inches wide and the egg-chamber varies between 9 by 7 inches, with a height of about 5 inches, to 6 by 6 inches, with a height of only 4 inches. This last was, however, in very hard soil, and must be exceptionally small.

I have never seen or heard of any remains of fish or insects in tunnel or nest

Otto Müller gives a description of their breeding in Sikkim which agrees well with the above, and Legge gives a similar account of their breeding in Ceylon. Cripps, however, writing from Dibrugarh in Assam, gives a very different account. He writes, as quoted by Hume: "April 27th, 1880, Borbam Tea-Garden, Dibrugar. Found four fresh eggs. On the borders of the tea-cultivation and along-side of heavy forest, a large dead tree had been blown down among the tea-bushes; there was a deal of earth clinging to the roots of this tree, and in this earth a hole had been excavated by the birds. The tunnel was 18 inches in length by 3 in height and $3\frac{1}{2}$ in width. The egg-chamber was slightly larger than the passage leading to it. Under the eggs were fish-bones, crab-shells, and the wings and heads of some kind of hard-shelled insects. No river or tank was within half a mile of the place. On the 22nd August last I saw another of these birds fly, with a fish in its mouth, into a hole in a dead and rotten chumpa-tree, about 15 feet off the ground. This tree was about 100 yards from the one above mentioned and was in the garden. I had it cut down, but the wood was so decayed that the tree went to shivers, destroying the young and all chance of measuring, etc., the hole."

In Travancore Stewart and Bourdillon found eggs in February and March, while in the Kuman Terai and Assam April and May seem to be the chief breeding months. On the other hand, they may be double-brooded, as Cripps found young in August and Bourdillon obtained four fresh eggs on the 20th July.

The number of eggs laid is four or five, and they are quite typical Kingfishers' in appearance.

Thirty eggs average 36.6×31.2 mm.: maxima 38.4×32.0 and 37.3×32.5 mm.; minima 34.2×30.5 and 35.5×29.3 mm.

(1549) *Ramphaleyon capensis burmanica* * (Sharpe).

THE BURMESE STORK-BILLED KINGFISHER.

Ramphaleyon capensis burmanica Fauna B. I., Birds, 2nd ed. vol. iv, p. 266.

This race may be said to be found over the whole of plains of Burma and Siam. It is not found in the Andamans, the bird occurring there being definitely separable.

* When compiling my Catalogue for the Journ. Bomb. Nat. Hist. Soc. I gave the Andaman bird the name of *osmastoni*, intending to review this species in the 'Bulletin' of the B. O. C. This was not done, and the name is, therefore, a *nom. nud.* The Andaman bird is paler and smaller than the Burmese race: wing 141 to 152 mm. as against 146 to 165 mm. in that bird, and the bill is larger, 78 to 85 mm. as against 72 to 84 mm. I now name it *Ramphaleyon capensis osmastoni*.

It occurs in much the same kind of country as the preceding bird and keeps quite as closely to forest. It ascends the hills for some 2,000 feet only and that but rarely.

Normally, or at least more often than not, this bird makes the usual tunnel and egg-chamber in the bank of some small stream but, at other times, it deposits its eggs in most curious positions.

Bingham is quoted by Hume as informing him "I am rather diffident about writing a note on the finding of the eggs of this bird, as they were found by myself personally in a made nest in the fork of a bamboo growing near the bank of a choung. Moreover, though I fired at the bird as she flew off, I missed her. In my own mind there is not a ghost of a doubt that the eggs in question belong to the above species, as I had a close look at the bird, as she sat on the nest, with a pair of binoculars, at not more than 15 yards distance. The nest was placed in a fork of a bamboo near water. It was a loosely constructed shallow cup of rough grass-roots, wholly unlined, at a height of about four feet from the ground."

As Hume says, the eggs sent to him are certainly Kingfisher's of sorts, and Bingham's identification of the bird was quite satisfactory, though the nest used was almost certainly that of some other bird. Herbert's account of its nesting is equally interesting and even more conclusively identified. He writes (*Journ. Siam Nat. Hist. Soc.* vol. vi, p. 308, 1924):—"The nest consists of a hole in a tree within easy reach of the ground, and I will give an account of the four nests that I have seen. The first was on 26/5/13, when I flushed the bird from a rotten mango-stump, which was only three feet high and was situated alongside an irrigation canal in the Samray fruit-gardens; there was one egg, which was visible from the pathway, and I therefore took it. The second occasion was on 12/5/19, when a collector caught the bird in a nesting-hole, sitting on one fresh egg. He brought both to me, and after measuring the bird I released it. The nest was in a branch of a Durian-tree at Banlampoo and about four feet from the ground. The third occasion was 28/7/19, when a collector missed the bird when it left its nest, which contained four slightly incubated eggs. The hole was in a dead patch in a growing Tamarind-tree at Bansakai, and was about six feet from the ground. In none of these cases was there any nesting material, and the dead wood was dry and clean. The fourth occasion was on 31/8/19, when I looked into a hole in a branch of a "tong-long"-tree at Koh Yai and found the bird inside. It left instantly, and there were about half-a-dozen green leaves arranged in the form of a nest."

Yet another curious site for a nest is given by Hopwood, who found four eggs laid in a chamber with a short tunnel cut in a "White-ants' nest-mound, standing on the bank of a stream."

The breeding season seems a long one. Hopwood, Mackenzie and Bingham all took eggs in March and April, while the latter also recorded them as breeding in February. Then we have

Macdonald taking hard-set eggs on the 16th May and Herbert taking fresh eggs and young in that month and finding a new nest not yet laid in on the 31st August.

They may, like *gural*, have two seasons and be double-brooded.

The full clutch seems to be three or four eggs. They are quite typical, but one clutch of eggs taken by K. Macdonald and another by Mackenzie have one end quite distinctly smaller and pointed.

Twenty-eight eggs average 36.5×30.6 mm.: maxima 39.9×31.3 and 39.3×32.1 mm.; minima 34.8×30.0 mm.; an abnormally small egg taken by Herbert measures only 32.1×26.3 mm.

Halcyon smyrnensis.

THE WHITE-BREASTED KINGFISHER.

(1550) *Halcyon smyrnensis smyrnensis* (Linn.).

THE EGYPTIAN WHITE-BREASTED KINGFISHER.

Halcyon smyrnensis smyrnensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 268.

Within Indian limits this Kingfisher is found from the Afghan boundary throughout the Punjab and Kashmir and in Sind and Baluchistan. Ticehurst also includes Rajputana, and the birds of this area, though somewhat intermediate, are nearer to the typical form than to *fusca*, the Indian form.

This is an exceedingly common bird wherever there are river-banks or canal-banks in which it can breed, and in Karachi MacArthur, Gates and Ticehurst all say that it also breeds freely in sides of the tanks and other places in the town itself.

In Rajputana Hume took eggs from a tunnel bored in the side of a well 100 feet below the surface of the country, and says that "the reason for the birds going to such an extraordinary depth appeared to be that the upper 90 odd passed through very loose soil, where the well was lined with masonry, and it had to go below this to pierce a hole." Butler also found five fresh eggs on the 7th May bored in the side of a well in Karachi, but this was only 10 feet below the surface.

The usual nest-hole, drilled in banks of streams and canals, may be anything between 2 and 4 feet in depth, sometimes, when in soft but firm sand-banks, as much as 6 feet. The tunnel is about 3 to 4 inches in diameter and the egg-chamber upwards of 6 by 6, while in height they may be 3 to 5 inches.

In rivers, which are subject to the usual spring floods, February and March are the normal breeding months, for the young have to be fledged before the snows melt and cause the first rush of water. In canals, wells and other places April and May seem to be the months in which most eggs are laid, and it is probable many birds are double-brooded, as Butler took eggs in July in canal-banks and others still later in August.

Six is the number of eggs most often laid, though occasionally seven are laid and at other times five only.

A curious character I have noticed in the eggs of this and some other Kingfishers is their appearance when fresh blown. If held up to the light they have marks such as those in ribbons which are called "watered." I have never seen these markings in eggs of Bee-eaters, Rollers or Owls.

Thirty eggs taken in India average 29.4×26.2 mm.: maxima 31.7×25.9 and 29.7×28.0 mm.; minima 28.2×24.6 mm.

Both sexes incubate and both assist in making the nesting-burrow, each bird working for a few minutes only at a time. When the tunnel is advanced a few inches I think both birds work together, as I have noticed that—in the case of *H. s. fusca*—both birds occupy the tunnel together, a little stream of sand coming out as one bird backs to the entrance, kicking the loose sand behind it. Such action would almost necessitate combined work, unless one bird first digs out a portion and then the other removes the loose material from behind the working bird while he or she rests.

(1551) *Halcyon smyrnensis fusca* (Bodd.).

THE INDIAN WHITE-BREASTED KINGFISHER.

Halcyon smyrnensis fusca, Fauna B. I., Birds, 2nd ed. vol. iv, p. 269.

The present race is found practically all over India with the exception of the extreme South of Travancore and the area occupied by the typical form in the North-West and Sind. It is one of the most common birds in Assam and thence throughout the whole of Burma, the Malay Peninsula and Siam.

This bird is one of forests and jungles as well as of all kinds of open and cultivated country. It is found throughout the plains wherever there are suitable rivers, tanks etc. on the banks of which it can breed. At the same time it is often found away from these. Betham says that round about Poona "This bird does not frequent rivers and lakes but is found away from these. The nests from which I took eggs were all situated in the banks of dry nullahs some distance from water. The nests were about two feet in and are used again and again even when the eggs have been stolen from them."

In North Cachar this Kingfisher bred in very great numbers on some of the bigger streams, the forest coming down to the banks on either side. When boating down these streams I have sometimes come on twenty or thirty nests in a day, just the usual tunnels dug in a bank for 2 or 3 feet, the eggs being laid on the bare sand except for odd scraps carried in by the birds accidentally or wind-blown. Sometimes, however, in these hills the birds make very abnormal nests. An article written by me, for 'The Asian' newspaper, before I had visited the rivers on which these birds commonly

nested, is perhaps worth quoting :—" It has another and, at least so far as these hills are concerned, a far more general habit of building a nest for itself, which may be said to roughly resemble a large, untidy edition of an English Wren's place of abode.

" First I had some eggs brought to me by a native, who said that he had taken them from a moss nest built amongst the overhanging roots of a tree growing at the side of a nullah. Some time after some more eggs were brought in to me and a similar description of the nest given, but on this occasion I went with the man to the nullah from which the nest was said to have been taken and we could find no trace of it, so I concluded he had been lying. The native, a Cachari, was, however, very positive in his assertions and went away swearing at my incredulity. Within a few days he came back with two newly laid eggs, a quantity of moss and a hen Kingfisher of this species alive in a basket. In this case he had found the nest embedded in a hollow in a rock and, setting a noose for the parent bird, had, on catching it, brought it to me with the remnants of the nest and the two eggs. Eventually I was fortunate enough to find a nest of this description for myself. I was creeping down a deep nullah, along the bottom of which a little water was trickling, and, making a false step, I splashed into a little pool of water, the noise frightening a Kingfisher, which flew from the bank close to my head and, looking up, I saw the nest—a mass of moss of a large oval in shape wedged into a hollow between two stones, covered at the top by another, and supported underneath by a projecting root. It contained four eggs which I took ; but the nest fell to pieces on being removed and appeared to be merely a lot of moss pushed into the hollow and then roughly fashioned into a hollow oval. Next year a pair of these birds were seen to frequent a nullah near a camping house where I was then halting. On some natives and myself searching about, one of the former discovered a nest just commenced to be built in a hollow, caused by a large oval stone, which had been previously half embedded in the earth, falling out. Dismissing my men, I seated myself on the opposite bank about twenty-five or thirty yards off, and behind a bush. Taking out a pair of opera-glasses I had not long to wait before one of the birds came back and, after taking a good look at the nest, went away again and returned in a few minutes with a mass of wet moss in his bill ; clinging to the edge of the hole it commenced forcing this moss into that already placed at the base of the hollow, pushing it with the front and pressing it with the sides of the bill, seeming to use all the force it was capable of. I could see no attempt at fastening it together or of intertwining it in any way, and this nest, when afterwards examined, proved to consist of layers of moss placed one on the top of the other. The force used in pressing the wet and muddy material together had rendered it sufficiently stable to stand the work required of it by the bird but, finally, on one piece at the base being removed, the whole structure at once came to pieces. Both birds worked hard at the

nest, for upwards of an hour, until nearly 10 A.M., when, as they seemed to have finished work for the time being, I went away.

"Returning nearly a month later I took six eggs from this nest, two showing signs of incubation and four fresh."

After I had written the above I found that for every bird which nested in the forest a hundred nested in the banks of streams, making the usual tunnel and chamber. Twice, however, after this I succeeded in finding other nests similar to the above, small natural holes, faced and backed by wet muddy moss.

In the rivers etc. I found the birds bred in the end of March to early May, and these seem to be the breeding months over most of the plains of India and Burma and in the Kuman Terai. Blewitt, however, found them breeding near Hansie in June and July; Adam says they breed up to June in the Sambhur Lake, during which month also Oates took eggs in Pegu.

In the nullahs and ravines in the forest, where flooding had not to be guarded against, I took eggs, full clutches, from the 4th April to the 26th August.

The normal full clutch of eggs is six; five or seven is quite common, while Whymper once took one of eight in the Nepal Terai.

It breeds there, as in the Assam hills, up to 4,000 but is much more common below 2,500 feet.

One hundred eggs average 28.9×26.2 mm. : maxima 31.1×27.7 and 30.3×28.0 mm. ; minima 26.0×25.6 and 26.2×25.0 mm.

Both birds incubate, both excavate their home and both tend and feed the young, at first in the nest and after about a month outside the nest. The young then perch in a row on the top of the bank above the tunnel or on any convenient branch or twig overhanging it. At night all the young and both the parents retire to the nest to sleep, and continue to do so until the young, or what remains of them, are dispersed.

(1552) *Halcyon smyrnensis generosa* Madarász.

THE CEYLON WHITE-BREASTED KINGFISHER.

Halcyon smyrnensis generosa, Fauna B. I., Birds, 2nd ed. vol. iv, p. 270.

This race of the White-breasted Kingfisher is confined to Ceylon and to the extreme South of Travancore.

The haunts of this Kingfisher are much the same as those of the other races, and it ascends the hills of Ceylon up to some 2,000 feet or a little higher, while in Travancore it hardly occurs even as high as this.

Normally it makes a tunnel and nest-chamber in the banks of streams, tanks and ravines like any other Kingfisher. Wait says merely that "the nest is the usual hole in the bank of a stream, pond or ditch." Legge says nothing about the position it breeds in, so we may conclude he came across nothing unusual. Phillips says of two clutches of eggs taken by him that one was taken from

a hole "situated in the side of newly dug silt pit and about a foot deep," while the second was taken "from the usual hole in a bank."

Layard, whose story Hume rather discredits, writes:—"The nest of this species is found in decaying trees. I have procured eggs in the North of the island in December, in the South in April."

Curiously enough, before I had any eggs of this bird sent me Lazarus wrote me: "I may be able to get you the eggs of the Kingfisher, but as they lay their eggs in holes in very rotten palms, it is almost impossible to get them unbroken."

I may say that I should never be surprised to hear that the statements of Legge and Lazarus have been confirmed.

All collectors agree that this race of the White-breasted Kingfisher makes a very short tunnel, generally only 1 to 2 feet in length.

The breeding season is from December to June, and I cannot trace any special month within these seven, but very few birds lay before February.

Fifty eggs average 29.4×25.9 mm.: maxima 32.0×28.0 mm.; minima 26.2×24.9 and 27.3×24.2 mm.

(1553) *Halcyon smyrnensis saturator* Hume.

THE ANDAMAN WHITE-BREASTED KINGFISHER.

Halcyon smyrnensis saturator, Fauna B. I., Birds, 2nd ed. vol. iv, p. 270.

This race is confined to the Andamans and Nicobars, where it frequents the mouths of rivers and creeks in more or less heavy forest.

Osmaston took many nests of the Andaman White-breasted Kingfisher in the Andamans, where they made the usual nesting-hole in banks, often where the water was quite brackish, sometimes actual salt sea-water. The tunnels seem to have been almost invariably between 2 and 3 feet long, while the breeding season is restricted to April and May.

The normal full clutch is three only, but twice in 1905 Osmaston obtained clutches of four eggs each.

Sixty eggs average 30.2×26.4 mm.: maxima 32.0×26.2 and 30.3×28.0 mm.; minima 28.9×26.4 and 29.0×24.3 mm.

(1554) *Halcyon pileata* (Bodd.).

THE BLACK-CAPPED KINGFISHER.

Halcyon pileata, Fauna B. I., Birds, 2nd ed. vol iv, p. 271.

This very handsome Kingfisher has an extraordinary range. It is very common in parts of South China, and Staff-Surgeon Jones found it breeding in great numbers about Hong Kong. It extends to Korea, and West of S. China it occurs in all the Indo-Chinese countries, in Burma and in practically all the islands from the Malay States to the Celebes. It has also occurred in Ceylon and in various coastal tracts in India and on the great tidal river-lands

far inland, while in the North-East it has been seen several times in Sylhet, Cachar and Upper Assam. Wherever it occurs it is resident and breeds.

In China, its real homeland, it breeds like most Kingfishers do, making a tunnel in banks of streams or hillsides and depositing its eggs in a chamber at the end. It often makes its burrow in very hard soil, Jones finding one made in disintegrated granite, so they are very short as one would expect, generally about 18 inches, sometimes rather more and sometimes, as in the granite, only a few inches deep. The egg-chamber always contains a mass of undigested scraps, "many elytra and other parts of beetles, bones of small reptiles and mammals, carapaces and other parts of small crabs in plenty" (Jones).

Doubtless it sometimes makes the usual nest-hole in banks elsewhere also. In Lower Burma Hopwood took one clutch of five eggs and another of four from holes in a clay bank of a sea-creek in a Mangrove-swamp, while Stewart took another four from a hole in a bank of a small river in Travancore forest. Sometimes, however, it makes its nest in very different places. The first nest I ever took was in a chamber which had been bored in a termite mound in dense forest in the Lakhimpur district, while Herbert records a still more curious site: "Taken at a spot about 10 miles below Paknampho on my way down to Bangkok by river in the middle of July. The nest was in the branch-hole of a tree at about six feet from the ground, and the bird left the tree as the launch was passing."

The breeding season seems to be May, June and July in most places, while Hopwood took his two nests in Tavoy on the 19th April.

On one occasion I found six eggs in a nest, but four or five seems to be the normal full clutch.

Forty-six eggs average 29.6×26.3 mm. ; maxima 32.2×28.0 and 31.0×28.8 mm. ; minima 28.0×25.3 and 28.6×24.9 mm.

Entomothera coromanda.

THE RUDDY KINGFISHER.

(1555) *Entomothera coromanda coromanda* (Lath.).

THE INDIAN RUDDY KINGFISHER.

Entomothera coromanda coromanda, Fauna B. I., Birds, 2nd ed. vol. iv, p. 273.

This beautiful Kingfisher occurs in the Outer Himalayas from Nepal to Eastern Assam, Burma, the Malay States and South-West Siam. There are three specimens in the Madras Museum, of which one was said to have been shot at Guduvancheri, 10 miles South of Madras.

Apparently the nest of this Kingfisher has not been taken except by myself. In the Assam hills I found it not very rare, though

one saw so little of it, between 2,000 and 4,000 feet, whilst odd birds might be met from the foot-hills up to 6,000 feet. It inhabited the deepest and most shady of forests and, even in these, kept to rugged and gloomy ravines where, if seen, it is just a little dark bird dashing past at such a pace that identification is impossible. Should it, however, cross a jungle-path or any other place where the light creeps in, it shows up for a second as some brilliant lilac or opal gem which fixes its identity without doubt. The nests are all, so far as I have seen, made in the banks of such ravines as I have described above. Here it is made in the moss-covered side, under the protection of a rock, boulder, bunch of ferns, *Caladium* or other plants, and never in the bare bank. It is consequently more difficult to find than that of most Kingfishers, and even when the bird quits it a few yards from the disturber of its peace it is often difficult to locate.

The tunnels are generally quite short, between 18 inches and 3 feet, while the chamber varies from about 6 inches across by $4\frac{1}{2}$ inches high to about 4 by 5 inches and less than 3 in height. The tunnel is 2 inches or less in diameter, both tunnel and chamber striking one as rather small in comparison with the size of the bird.

I have never seen any mass of insect remains in the nest, but I have seen scraps of moss, though these latter I am sure are accidental.

The eggs are laid from early April to the end of May, and possibly a few birds lay in the end of March.

The full clutch of eggs seems to be five and very rarely six.

Thirty eggs average 27.3×23.2 mm. : maxima 29.4×23.6 and 28.9×24.2 mm. ; minima 26.2×23.0 and 27.0×21.5 mm.

As is shown by the above measurements the eggs are less spherical than those of most Kingfishers.

Both sexes incubate, as we have caught both on the eggs, but I know nothing about the excavation of the tunnel. I do not think the birds ever nest twice in the same burrow, though they stick very closely to their favourite ravine. I took a nest once in 1907 in a certain deep ravine in *Rhododendron*-forest, and in 1921 sent one of my collectors to the same ravine, where he again found a nest with six eggs, which he sent me together with a male bird noosed at the entrance to the tunnel.

Sauropatis chloris.

THE WHITE-COLLARED KINGFISHER.

I have again gone into the question of the subdivision of this species into races, but on account of the great individual variation to be found in most areas and the overlapping of the distinctive characters alleged to divide one from the other I adhere to those only which I accepted in the 'Fauna.' *Armstrongi*, which Robinson

would like to keep apart but does not do so in his 'Fauna,' cannot be maintained in my opinion, though this and *humii* may have better grounds for separation than some of the island forms. Very extensive material should be examined before these are accepted, and it should also be *all* breeding material.

(1557) *Sauropatis chloris chloris* (Bodd.).

THE MALACCAN WHITE-COLLARED KINGFISHER.

Sauropatis chloris chloris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 275.

The typical form of *chloris* occurs in the coastal districts of North-Eastern Bengal and has once been taken in Cachar. It is found in all the coastal districts of Burma, Siam, the Malay States, Annam, Sumatra, Borneo and Java.

In 1913 Kellow had eggs brought to him by natives said to have been taken from tunnels bored in tree-ants' nests and, in one case, a female, said to have been caught on the nest, was produced. When sent to me I placed the eggs on one side until this strange story could be confirmed or contradicted. Then in 1915 and in subsequent years E. G. Herbert took many nests in Siam and proved the story to be true. Herbert gives a good account of the nesting etc. in Siam which is quite exhaustive. He writes (Journ. Siam Nat. Hist. Soc. vol. vi, p. 310, 1924):—"The Bangkok district seems to be a popular nesting place for this Kingfisher, as it is present in greater numbers at that season than at any other time of the year.

"The nest is nearly always made in a black-ants' nest, which is situated in a hollow tree at a height of about 20 feet from the ground. The ants will often block a big hole a foot or more in diameter in a growing tree, though at times the hole will not measure more than a few inches. The birds bore a neat, circular hole in the live ants' nest and excavate a cavity just inside for the egg-chamber. Occasionally the nest may be found in a dead stump of a tree, where the wood is comparatively soft and can be easily worked. I have seen two instances of this, one at a height of twelve feet and the other within a foot of the ground. Another situation was in a white-ants' hill, which was about 3 feet high. This white-ants' hill was close to a native house in a fruit-garden near Paklat, and the first time I visited the place was on 16.5.13. On this occasion the young had left the nest and were sitting on a tree close by. The owner of the house offered to show me the nest, and chipped a line around the side of the ant-hill at the level of the entrance-hole, so that the top could be lifted off complete. This he did, exposing to view the nest and entrance tunnel. He said that he had taken the top off in this way on several occasions and that the birds had not deserted. He also said that the birds nested there every year at about the same time. The following year I again visited the spot

and the man opened the nest in the same way, showing me on this occasion three half-fledged birds. The parent birds were exceedingly noisy, but shortly after we had finished one of them entered the nest, so there was no fear of them deserting. The ants' nest was 'alive,' and the ants set to work at once to join the top with the main block. The base of this ant-hill, below the entrance to the nest, was littered with pieces of the shells and claws of the small land-crabs, showing that this is the principal food of these birds. The fruit-gardens appear to be the favourite nesting place, although nests may also be found in other places. May is the best month for eggs, but I have found eggs as early as the 10th March, and young birds in the nest as late as 22nd August."

Kellow's nests, it should be noted, were taken in January.

Thirty-two eggs average 28.9×24.2 mm.; maxima 32.0×25.2 and 31.0×26.2 mm.; minima 27.8×23.0 and 28.0×22.5 .

(1559) *Sauropatis chloris occipitalis* (Blyth).

THE NICOBAR WHITE-COLLARED KINGFISHER.

Sauropatis chloris occipitalis, Fauna B. I., Birds, 2nd ed., vol. iv, p. 277.

This race of White-collared Kingfishers is confined to the Nicobars.

Davidson records the nidification and habits of this bird as follows:—"I found the Nicobar Kingfisher commencing to breed about the latter end of February, but the only egg I obtained was taken from the oviduct of a female which I shot on the 24th of February just as it was entering its nest. I found three nests on the island of Camorta, and all of them were excavated in deserted ants' nests. These ants' nests are generally placed against the trunks of very large trees, but occasionally against those of Cocoa-nut-palms, at heights of from 4 to 20 feet from the ground, and vary from 12 to 30 inches in diameter; being composed, as I believe, of some sort of clay, they are extremely hard and difficult to break. I had to dig out the nests with a large clasp-knife. It is in the larger nests the Kingfishers' nests are excavated. The tunnel, about 2 or $2\frac{1}{2}$ inches in diameter, is in the centre of the ants' nests, and goes in for about six inches, where it terminates in a chamber about 7 inches in diameter. I saw the bird fly out of two of the nests."

De Roepstorff took two eggs from a similar nest on the 13th March which the birds had cut in a white-ants' nest in a mangrove-swamp. The bird was caught on the nest.

Osmaston also took two eggs from a similar ants' nest on the 28th April in Car Nicobar. These two eggs measure 30.0×24.3 and 28.0×24.0 mm.

I have also five other eggs purchased from a small American collection and dated 17. iii. 03 which agree with the above.

(1560) *Sauropatis chloris davisoni* (Sharpe).

THE ANDAMAN WHITE-COLLARED KINGFISHER.

Sauropatis chloris davisoni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 278.

The Andaman representative of this Kingfisher is restricted to the Andamans and Little Cocos Islands.

The only record of the breeding of this Kingfisher I can find is that by Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. vii, p. 169, 1906), who writes :—"Very common everywhere along the coast or up brackish creeks. Feeds largely on grasshoppers as well as fish. Found several nests in April and May. They are usually in holes in banks, only about a foot deep, occasionally also in holes in white-ants' mounds or in the upturned roots of a tree, and one nest I observed was in a hole in a mango-tree about 15 feet from the ground.

"Three or four eggs are laid, exhibiting very little or no gloss."

Anderson and Wickham also obtained nests in the Andamans containing four eggs each. In these instances the nests, however, were in ants' nests high up in dead trees.

The breeding season is from the middle of March to the middle of May, and I have eggs taken from the 15th March (Wickham) to the 11th May (Osmaston).

Thirty eggs average 29.3×24.5 mm. : maxima 31.0×26.5 mm. ; minima 27.6×23.3 and 29.0×23.0 mm.

Lacedo pulchella (Horsf.).

THE BANDED KINGFISHER.

(1562) *Lacedo pulchella amabilis* (Hume).

THE PEGU BANDED KINGFISHER.

Carcinantes pulchellus amabilis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 280.
Lacedo pulchella amabilis, *ibid.* vol. viii, p. 678.

This Kingfisher is found in Lower and peninsular Burma and Siam and the Malay States, and also in Cochin China and Annam.

There is nothing on record about the nidification of this bird except a note by Herbert, and even that is given with some doubt.

Over most of its area it is a frequenter of streams in forest, and Kellow's collectors took several nests near Taiping containing four eggs each. Every clutch, according to the men, was taken from short burrows made in the banks of small streams in more or less open forest. Unfortunately the men never troubled to catch a bird, as they knew it well and were quite satisfied about the identification. In consequence neither Kellow nor I ever saw a bird to corroborate their statement.

Herbert has the following notes on its breeding (Journ. Siam Nat. Hist. Soc. vol. vi, p. 311, 1924) :—"I have one clutch of three eggs which were brought in from Meklong by my head collector (26/5/14). He just missed the bird when it flew from the nesting-hole, and as it did not return, he took the eggs. The bird was well known to him both in the field and also as a specimen. The 'Fauna of British India' gives the nidification as unknown, and I do not know of any record by which I can compare these eggs. But they are clearly the eggs of a Kingfisher and in shape and measurements they are unlike any of the others, so I have no reason to doubt their being authentic. The nesting hole was in a dead tree about six feet from the ground.

"The eggs are broad, almost spherical ovals. The measurements are 27.3×23.6 , 27.1×23.0 , 26.6×22.6 (av. 27.2×23.0 mm.)."

After this note was written, but long before it was published, Herbert obtained a second clutch of five eggs at Klongbonglai, apparently in a similar position, the eggs also similar but much smaller.

There can be no doubt now that Herbert's clutches are both properly identified, but Kellow's eggs are of course still doubtful.

The clutch of five taken by Herbert vary, according to my measurements, from 24.3×20.0 to 25.5×20.3 mm.

They were taken on the 26th February, 1917.

The eggs sent me by Kellow were taken between the 16th February and the 3rd May.

Family BUCEROTIDÆ.

(HORNBILL.)

Dichoceros bicornis.

THE GREAT HORNBILL.

(1563) *Dichoceros bicornis bicornis* (Linn.).

THE INDIAN GREAT HORNBILL.

Dichoceros bicornis bicornis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 284.

The Great Hornbill occurs on the South-West coast of India from Travancore to about the latitude of Bombay City. In the Himalayas it is found from Kumaon to East Assam and the hill districts of Eastern Bengal. Thence it extends over practically the whole of Burma, the Malay States and South-West Siam.

This Hornbill frequents forest, both the densest evergreen and open park-like woods of scattered Oaks. I have, however, never seen it in the Pine-woods of the Khasia Hills, though it breeds at the same altitude in the Oak-forests of the adjoining North

Cachar Hills. It occasionally breeds in the plains next to the hills but more often between 1,500 and 2,500 feet, while I have taken odd nests up to 4,000 feet. In Travancore Stewart and Bourdillon found most nests at about 2,000 feet, as did Whymper in the Kuman Terai.

The nesting of this Hornbill is well known, and in Hume's 'Nests and Eggs' there are long accounts by Tickell, Oates and Bingham of their breeding in Burma, by Bourdillon in Travancore and by Thompson in the Himalayas. Since 'Nests and Eggs' was written Whymper and others have taken them in the Western Himalayas, while Coltart, Inglis, Primrose, myself and others have done so in the Eastern Himalayas and Stewart has found a great many nests in Travancore.

The eggs are deposited in natural hollows in high trees, generally 50 or 60 feet from the ground, sometimes much higher still and very seldom as low down as 20 feet. The hollow selected may be of any size, and one nest taken by myself was entered by a natural hole, certainly under a foot in diameter, while the eggs lay in the bottom of the hollow, fully 20 feet lower down. More often they are 2 to 5 feet or so from the entrance. Many nests are in trees which are unclimbable without much preparation but, if bamboos are growing anywhere handy, the hill-tribesmen can get up to most of them by making ladders of spikes driven into the tree a couple of feet apart and then tied with canes or creepers to bamboos at the free end. Such ladders are very strong and, though it has made me almost sick to watch the men careering up and down them, I have never known of an accident. Whatever size the hole itself is—and it may be anything from a couple of feet to 4 feet in diameter—the birds prefer a comparatively small entrance, just big enough for the hen bird to step easily in and out. In every case in which I have personally inspected the nest the entrance has been plastered up, leaving only a small round hole or oblong slit big enough for the female to put the tip of her bill through. As a rule directly the first egg is laid the hen bird goes into the nest and does not come out until the young are well advanced. Sometimes, however, she continues to come out until her full clutch is laid, after which she never ventures abroad. In the same way sometimes when the chicks are hatched and a few days old she leaves the nest and helps her husband to feed them but, more often, she stays with the young ones until they are almost ready to fly. When she has decided that it is time to remain sitting in the nest she at once starts reducing the sides of the entrance by plastering it all round with her own excrement mixed with remains of fruit etc. and such scraps of dead wood as may adhere to the excrement in the nest. Sometimes, but not always, the male may assist by adding fresh clay-mud and his own droppings, but I think this is exceptional. When dried the plaster used is as hard as brickwork almost and takes a strong knife or small hatchet to cut away, so it must be real hard work for the birds to remove it sufficiently to permit the female and young to leave the nest.

The male is an extraordinarily good father, and seems never to cease feeding the female and young, having no time to feed himself, so that, by the time they emerge, he is skin and bone and they, however dirty and bedraggled, are as fat as butter. The hen-bird moults on the nest and gets her new flight-feathers and, as a rule, is much less dirty than one would expect to find her. Nor, as a rule, is she stiff, as she is constantly climbing up the inside of the tree to the entrance either for food or to continue the work of stone-mason. If the hole is very small and she has no room for exercise she becomes, of course, very cramped, and I have known a female quite unable to fly for some hours after release, though her wing-quills were all complete.

I have had the opportunity of watching nesting sites for the whole season and, though it is hard to fix exact dates of laying etc., I think incubation takes about twenty-eight days and that the fledgling period is from four to six weeks, the latter varying considerably. Eggs are often laid at intervals of two or more days, a fact which adds to the difficulty of fixing the periods for the different stages. The hillmen say that incubation takes thirty-one days.

Sometimes the entrance to the nest-hole may be left *in statu quo* and not closed in. Thompson says he has seen—from the ground—nest after nest of this bird and that none were closed in. Bourdillon also says of one nest that there was no attempt at plastering the female in.

The breeding season in Travancore is February, March and April; in Burma January to March; in the Western Himalayas March and April, and in the Eastern the middle of February to the middle of April, a few birds in the higher ranges laying in May.

Usually two eggs are laid, very rarely three, while one only is often incubated. Even where more than one is laid I have often noticed that only one young one is hatched and reared.

The eggs are white, sometimes tinged with cream, but they soon become very stained and dirty; in shape they are true ovals, very little pointed at the smaller end. The texture is very hard and coarse and the surface very rough, often covered with granules and sometimes with depressed lines and minute pits.

Forty-four eggs average 65.1×45.3 mm.: maxima 72.2×47.2 and 66.0×50.0 mm.; minima 59.8×47.8 and 65.0×42.0 mm.

The birds pair for life and return year after year to the same nesting-place, and apparently live to a very great age. The Cacharies and Mikirs showed me hollows in trees which they said had been occupied by these birds for longer than any one could definitely remember.

In taking the eggs of this bird great care must be exercised as the female fights desperately, climbing up the inside of the tree to meet her opponent at the entrance and fight him there.

The flesh of this bird is excellent and is much sought after by the natives, who farm the nests and will never allow more than one young one to be taken.

(1564) *Hydrocissa coronata* (Bodd.).

THE MALABAR PIED HORNBILL.

Anthracoceros coronatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 286.

Hydrocissa coronata, ibid. vol. viii, p. 678.

This Pied Hornbill occurs on the Western coast of India from Travancore, throughout the Bombay Presidency, to Ratnagiri; the Central Provinces, Chota Nagpore, Bihar, Western Bengal and Orissa. It is also common in Ceylon.

There is practically nothing on record about the breeding of this Hornbill, though it is a very common bird in both Ceylon, Travancore and Kanara. Davidson had an egg brought to him with an old bird. Wait merely says that the curious nesting habits are those of the family and that it lays two to four eggs from March to June.

I have two eggs in my collection, given by Barnes to J. C. Parker, which were taken in Ratnagiri on the 11th March and a single egg taken with a young bird by Stewart on the 15th March in Travancore.

Their habits seem to be exactly the same as those already recorded for the Great Hornbill, and they have the same custom of walling in the entrance to the nest-hole as soon as the female commences to incubate.

The three eggs in my collection, referred to above, measure 54.0×37.4 , 55.0×36.2 and 56.2×41.3 mm. All three are very stained, the single one being almost the colour of mahogany.

Hydrocissa malabarica.

THE LARGE PIED HORNBILL.

(1565) *Hydrocissa malabarica malabarica* Gmelin.

THE INDIAN LARGE PIED HORNBILL.

Anthracoceros malabaricus malabaricus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 288.

Hydrocissa malabarica malabarica, ibid. vol. viii, p. 678.

This Hornbill ranges from the Siwalik Hills and Dehra Dun in the West to Bihar and Assam in the East. It is found in Western Bengal in Chota Nagpore, Midnapore and Purulia. Birds from Southern Assam, Chin Hills and extreme Northern Burma are intermediate between the Indian and Burmese forms, but have the large bill of the former, and may be retained under the same name.

There is nothing on record about the breeding of this race, but Whympers got several nests in the Kuman Terai; Gill took a nest near Gonda in Oudh, Primrose found it breeding near Bishnath in Upper Assam and I took many eggs in Cachar.

It breeds in the plains and in the hills up to some 2,500 feet, selecting lofty trees standing in deciduous forest, mixed bamboo- and scrub-jungle or in secondary growth. So far as I am aware

it never nests in trees in evergreen forest though occasionally it makes use of dead trees standing in cultivated fields, deserted or used, which are surrounded by such forest.

The entrance selected is nearly always high up, generally over 40 feet, leading into a large natural hollow which may fall away some feet from the entrance. This is blocked up in much the same way as is that of the Great Hornbill, but is not so effectively closed, and I have seen room left sufficient for the hen to put her whole head out. Nor, as a rule at all events, is the female immured for so long a time, for I have frequently seen both sexes busy feeding the young, the clay entrance having been partly broken down.

Due, I presume, to easier duties, the male never gets to the bedraggled skin-and-bone condition that *Dichoceros* often presents after the breeding season is over.

In Kuman Whymper found all his nests in April, Gill also taking his in Gond on the 22nd of that month. Primrose found a single fresh egg on the 5th May, and I found hard-set eggs on the 25th. Even in Assam, however, most birds lay in April and a few as early as March.

The birds lay two or three eggs. Whymper found most clutches to be three, but in Assam threes are exceptional.

The eggs are small replicas of those of the Great Hornbill, but the surfaces are much less coarse and pimply.

Eighteen eggs average 49.0×34.9 mm. : maxima 54.0×38.0 mm. ; minima 47.0×35.0 and 49.0×33.2 mm.

(1566) *Hydrocolissa malabarica leucogastra* Blyth.

THE BURMESE PIED HORNBILL.

Anthracoceros malabaricus leucogaster, Fauna B. I., Birds, 2nd ed. vol. iv, p. 289.

Hydrocissa malabarica leucogastra, ibid. vol. viii, p. 679.

The present race is found over the whole of Burma from the Kachin Hills and Shan States to the extreme South of Tenasserim, while East it ranges into Siam, Annam and Cochin China.

Oates obtained two clutches of this bird's eggs in Pegu on the 20th and 22nd March. Bingham also took a clutch of eggs on the 23rd March in Tenasserim and some others earlier still. Cook took two nests in the Southern Shan States on almost exactly the same dates, 20th and 21st March, while near Prome Mackenzie secured a clutch of three on the 28th March and one of two on the 1st April.

Bingham gives an interesting account of the taking of one nest which would do equally well for almost any of the others. He writes ('Nests and Eggs,' vol. iii, p. 72):—"Crowning the top of a low hill, and towering high above the rest of the trees, stood a giant pyrama, (*Lagerstræmia flos regince*). On the 23rd March

I found a nest of the above-mentioned Hornbill in a hole in a huge decayed branch of this tree, fully 50 feet above the ground. To ascend the tree I had to get a ladder prepared, which a couple of Karens accomplished in about an hour and a half. So firm and strong did the affair look, that I went up myself and was able to examine the nest closely. This was, as I have said, in the stump of a decayed branch; but the entrance to the hole was greatly contracted by a substance that looked like the bird's own dung; on one side, however, an opening had been left, a mere slit about 10 inches long by $2\frac{1}{2}$ inches in breadth, through which evidently the female received food. After carefully inspecting the outside of the nest, I proceeded to break it open with a *dah* or Burmese knife I had taken up, and soon made a hole large enough for me to introduce my hand and arm. No sooner had I done so, however, than the female seized my wrist, with a grasp like that of a vice, uttering the most horrible cries and fluttering and struggling the while in the most determined manner. With some difficulty I managed to despatch her, as her skin was necessary for the eggs. Having dropped her I proceeded to take the latter out; these were two in number. The hollow was about 2 feet long by 10 inches in height, the entrance being an irregular oval in shape and measuring 10 by $7\frac{1}{2}$ inches."

The breeding season, as shown above, is March and probably early April, while the eggs number two or three and are indistinguishable from those of the preceding bird except that they are a trifle smaller.

Twenty-two eggs average 46.2×34.3 mm.: maxima 52.0×35.0 and 47.2×35.6 mm.; minima 43.1×35.0 and 44.6×32.2 mm.

(1567) *Rhyticeros undulatus* Shaw.

THE MALAYAN WREATHED HORNBILL.

Rhyticeros undulatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 201.

This fine Hornbill is found in Assam South of the Brahmapootra, the hill-tracts of Eastern Bengal and thence over practically the whole of Burma, the Malay States to Singapore, Sumatra, Java and Borneo.

It is found in the plains and ascends the hills up to at least 5,000 feet and probably 2,000 feet higher. Robinson also records it at 5,000 feet on the main Selangor range near Gunong Ula Kali. It is a forest Hornbill and keeps much to thicker cover of tall trees but, sometimes, frequents the thinner, more open parts, especially those with any *Fici* in fruit.

In Assam I found several nests on the high ranges in the East of Cachar. Here at 5,000 feet the country was mostly very rugged and the forest consisted mainly of stunted Oak. Here and there were also small groups of an enormous kind of tree which stood,

often on the ridges, dwarfing all the Oaks around them, and in these mighty trees the Wreathed Hornbill sometimes found a tree with a hole in it suitable for breeding.

Theobald had eggs brought to him in Sandaway and Bingham took several in Tenasserim, all during March, while in the same month Hopwood took two eggs near Tavoy.

To describe this Hornbill's breeding habits is merely to repeat what I have already written about the Great Hornbill. It has the same unfortunate habit, from the collector's point of view, of selecting holes in trees at enormous heights from the ground, which holes it plasters up in the same manner with its own excrement, remains of fruit etc.

March and April are the usual breeding months and, though I once took two eggs on the 6th June, the Nagas told me that they had previously taken two eggs from the same nest-hole in April.

Neither I, Bingham nor any other collector seems to have found more than two eggs in a nest, but the hill people told me that three eggs were sometimes laid, and this must be the case as I have seen three young with their parents.

The eggs are like those of the Great Hornbill and are just as coarse in texture, but the surface is not nearly so pimply and rough.

Twenty-five eggs average 63.0×43.2 mm. : maxima 72.1×43.7 and 69.9×47.1 mm. ; minima 49.5×38.0 mm.

In examining the material of which the wall round the entrance is made I found it full of small *Ficus* seeds, the male having evidently fed the female largely on these fruits. The masonry material remains soft for many hours after it has first been laid on the edges round the hole, but the birds never seem to damage or displace it in feeding or being fed, the edge always appearing neat and finished.

(1568) *Rhyticeros subruficollis* Blyth.

THE SMALLER WREATHED HORNBILL.

Rhyticeros subruficollis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 292.

This Hornbill has a rather curious distribution. It is by no means uncommon in Tenasserim and in peninsular Siam and again in Sumatra and Borneo, though in the Malay Peninsula hardly anything is known of it. It has been seen near the coast in Malacca, doubtless on local movement from the hills in search of some special food.

Its breeding habits are exactly the same as those of the larger Wreathed Hornbill, but Bingham, who saw many nests in Tenasserim, remarks :—" I found several nests, which were precisely like those of *R. undulatus*, but in immense high trees, and far more secure than the nests of any other species from the height and inaccessibility of the localities chosen. The entrance-holes were closed up

exactly in the same way as in the case of others, with a plastering of mud etc."

One nest taken by Bingham was 60 feet up in a Myonkchaw-tree (*Homalium tomentosum*), a second taken by Oates was 70 feet up, while others taken by Hopwood and Macdonald were in much the same position.

All the eggs known of this Hornbill have been taken in February or March and in every case either two or three eggs were found.

Eleven eggs average 57.1×42.0 mm.; maxima 60.3×46.5 and 61.0×47.0 mm.; minima 51.0×38.1 mm.

The females of this species when caught on the nest are said to fight just as viciously as those of the Great Hornbill. They are also said to be just as fat and well conditioned.

(1570) *Aceros nepalensis* (Hodgs.).

THE RUFOUS-NECKED HORNBILL.

Aceros nepalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 294.

The Rufous-necked Hornbill extends along the Outer Himalayas from Nepal to Eastern Assam, Cachar, Manipur, Looshai Hills, the Burmese hills from the Kachin and Shan States, through Karenni, to Mt. Muleyit in Tenasserim. It occurs in Siam and Delacour obtained it in Annam.

This is truly a mountain bird as well as a lover of forest, either deciduous or evergreen, and it is seldom, if ever, found breeding in the plains. I obtained all my nests, a fair number, between 2,000 and 5,000 feet, mostly at about 4,000 feet.

Gammie gives a most interesting account of the taking of an egg of this species, and his account of the nest etc. is so absolutely identical in all details with many of those found by myself that I quote it almost in full. He writes ('Nests and Eggs,' vol. iii, p. 77):—"The tree was a species of *Dysoxylon*, 80 or 90 feet in height, unbranched for 50 feet up, and situated close to a stream at an elevation of about 2,000 feet above the sea. A few feet under the lowest branch, and just above a bulge in the stem, there was a vertical slit which proved to be the entrance to the Hornbill's home. Long bamboos were cut and formed into a very primitive ladder, and a Nepalese ascended.

"The opening appeared ridiculously small for the admission of such a huge bird, and we could see quite distinctly the plaster on either side of the slit. The plastering had evidently been done by the female from inside, and did not meet in any part. At the top of the slit there was a round hole left, and from this hole to the bottom there was a narrow slit of about 2 inches broad down the middle. The man stood on the bulge in front of the nest, and held on by a small forked bamboo which he had hooked on to

the branch above, and then commenced the struggle between the Nepalese and mother Hornbill.

"The old lady cackled and protested as well as she could do, and bit manfully at the stick and Kukri (Nepalese knife) which the man pushed in her mouth to make her cease from resisting and go upstairs—the tree was hollow I should say for some way up.

"After a quarter of an hour's conflict the Pahari descended in despair.

"A big Lepcha then went up and, strange to say, he only gave her a single poke, when up she went aloft, and we saw her no more.

"Certainly she deserved credit for her pluck, which after all was misplaced, for the solitary egg was added.

"I am told that two young ones were taken out of the same hollow last year."

Gammie himself took another egg out of it on the 28th April the following year.

It is extraordinary the way Hornbills of all sorts stick to their nesting sites, for many are robbed year after year, yet the birds refuse to leave them. At the same time the birds may have learnt that the hill tribesmen never rob a nest twice in the same year, and as all the well-known nests are considered the property of certain villages, this ensures the second batch of eggs being left in peace.

Occasionally this Hornbill makes use of holes in trees, for nesting purposes, comparatively low down. Among my own notes I have the following heights recorded : 60, 50, 40, 30, 25 and 20 feet from the ground.

The breeding season runs from March to June and in the lower elevations birds undoubtedly breed earlier than at 5,000–6,000 feet. At the same time I obtained a nest with two hard-set eggs at 5,000 on the 2nd March, while another was taken at about 2,500 feet on the 7th June.

A single egg seems to be laid just as often as two, and I have never seen three eggs or young. They are quite typical Hornbill's eggs and are very nearly as coarse in texture and as much corrugated on the surface as the eggs of the Great Hornbill. In shape they are rather long ovals, very slightly pointed.

Twelve eggs average 59.2×43.1 mm. : maxima 68.0×44.5 and 63.2×46.5 mm. ; minima 54.3×40.0 mm.

The nest-holes are closed in with material to a less extent than are those of the Great Hornbill, and I have seen an opening left big enough for the hen bird to put her whole head out. She has a curious habit of sometimes coming to the mouth of the hole and braying long and loudly, her great clanging cries being audible at very great distances and, one would think, betraying the site of her nest to all possible enemies.

Ptilolæmus tickelli.**THE BROWN-BACKED HORNBILL.**(1572) *Ptilolæmus tickelli tickelli* (Blyth).**THE TENASSERIM BROWN-BACKED HORNBILL.***Ptilolæmus tickelli tickelli*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 297.

This Hornbill is restricted to Tenasserim in Southern Burma, where it keeps to dense forests, both deciduous and evergreen, in the plains, the foot-hills and some 4,000 feet up in the mountains.

Bingham gives a good account of its nesting :—"Looking at it I saw it was *Ocyrceros tickelli*. I was on the point of firing when I noticed its beak seemed covered with mud, and instantly afterwards I saw a small hole in the very tree it was seated on, the sides of which also appeared to have mud on them. In 5 minutes Myat-jo ascended to interview the 'missis.'

"After peering and stirring the female about with a stick Myat-jo announced 'no eggs yet.'

"Visiting it later on I was able to secure the female and no less than 5 eggs all fresh. The hollow was in a pyinkado-tree and not above 12 feet from the ground. This is surprising, especially as the other two nests examined were also at heights of less than 20 feet, and all in small trees. The material used for partially blocking up the entrance seems, in this bird's case, similar to that of *D. cavatus* (= *bicornis*).

"Subsequently I managed to procure 3 more nests on the 5th March; these contained 4, 3 and 2 eggs respectively.

"I found another nest on the 23rd February on the Meknay Choung. It contained three fresh eggs."

Since then Hopwood and Macdonald obtained the nests near Tavoy and Amherst containing two or three eggs and, like those taken by Bingham, all laid in natural holes in small trees—generally pyinkado—quite low down, between 10 and 20 feet.

The breeding season is January to March and the normal clutch three, although, as stated by Bingham, four or five eggs are occasionally laid.

The eggs are just like those of the genus *Hydrocissa*, smoother than those of *Dichoceros*, but otherwise quite typical.

Twenty-five eggs average 46.4×33.8 mm.; maxima 51.2×32.2 and 48.2×35.5 mm.; minima 42.3×32.6 and 44.1×32.2 mm.

Bingham's remark as to the mud on the bill of the male bird is interesting as it shows that in some cases, at all events, he assists in blocking up the entrance. Probably, as with most Hornbills, the female does most of this work, the male assisting now and then only.

(1573) *Ptilolæmus tickelli austeni* (Jerdon).

THE ASSAM BROWN-BACKED HORNBILL.

Ptilolæmus tickelli austeni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 298

Godwin-Austen's Hornbill, as this bird has hitherto been called, is very common in the foot-hills and up to some 2,000 feet in Eastern Assam; in Cachar it was rare, but occurred in the Jetinga Valley and in the plains adjoining the Naogong District, while I once saw it at about 3,400 feet on the Barail Range. It keeps entirely to forest unless tempted out of it by some special food-supply such as seeding bamboos etc.

I first found it breeding in North Cachar near Gungong at about 2,400 feet. The hollow selected was one in quite a small tree, or rather tree-stump, standing at the upper end of a ravine on a grass-covered hill which had once been forest and was surrounded by tree-jungle on all sides. I was ploughing my way through the last of this jungle when I noticed a bird put its head out of a hole in the stump in question, from which another bird, a Hornbill of some kind, had just flown away. The hole was about 20 feet up, and reduced in size by the usual mud plastering round the edge, yet still big enough for the bird to put her whole head through. A Naga who was with me clambered up the tree, and after a stout fight with the bird inside collared her by the neck and hauled her out. Handing me the bird to hold I saw to my delight it was the present species, and told the Naga to hunt for the eggs if any. A further visit to the hole produced a single egg which, though quite fresh, was already stained a deep fawn-brown. The bird looked so tattered and abject that it appeared impossible for it to fly but, when for a second we dropped it on the ground, it was off and away before I could grab my gun and shoot it. Later Peddie found this Hornbill not uncommon in the foothills and plains near Naogong, while Coltart and I obtained numerous nests in Lakhimpur.

In every case the hole chosen for laying in was comparatively low down, varying between 12 and 25 feet from the ground, but two clutches of eggs with the birds brought us by Nagas were said to have been taken from holes very high up in huge forest-trees. The holes are closed in with excrement and remains of fruit as usual, but larger holes were left for the hen bird to feed through and, in one or two instances, we found she could put her whole head through it.

They are late breeders and nearly all the nests we found were taken in late April, May and June.

Three is the normal full clutch and neither Coltart nor I ever found more but, in most cases, the eggs were fresh, and more might have been laid if we had not taken them. The Nagas told us that four or even five eggs were laid, though but rarely. Every

Naga is a born field-naturalist, they had no object in deceiving us, and we never found they did so until they became semi-civilized.

Twenty-four eggs average 48.8×34.2 mm. : maxima 57.0×34.1 and 49.3×35.4 mm. ; minima 46.0×33.0 mm.

The work of plastering up the entrance-hole is carried out principally by the female ; the male, who has to feed the female as soon as she commences incubation, has but little time for architecture, but at odd moments adds a little to the plaster. As with most Hornbills, the female generally remains in the nest until the young are ready to fly, but this is not always the case, for I have noticed females of this and of other species sometimes assisting the male in feeding the young through the entrance-hole, much of the plaster having been broken away to allow of her exit.

The Nagas say that incubation takes twenty-four days and that the young stay in the nest for about two months after hatching.

(1575) *Tockus birostris* (Scop.).

THE COMMON GREY HORNBILL.

Lophoceros birostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 301.

Tockus birostris, *ibid.* vol. viii, p. 679.

I can add nothing to the distribution of this Hornbill as given in the 'Fauna,' which is as follows :—From the base of the Himalayas, throughout the better-wooded parts of the Indian Peninsula, except on the Malabar and Travancore coasts ; it does not occur in Sind, the Punjab or the greater part of Rajputana but has been found on Mt. Abu ; it extends to Western Bengal and Bihar but not to Eastern Bengal or Assam.

This is one of the common birds of the Indian plains, being found everywhere in well-wooded country and breeding freely round towns and villages and even in gardens, when these contain suitable trees with holes for breeding purposes. C. Horne, quoted by Hume ('Nests and Eggs,' vol. iii, p. 74), gives an excellent and exhaustive account of this bird's breeding. He writes :—"In April 1908 I received news of two nests and found that both had been made in the trunks of cotton-trees (*Bombax heptophyllum*), the bird having dug out and enlarged with his bill holes in the soft wood, which had been previously used by Parrots.

"In each case I obtained 3 eggs ; and the hole, at a great height from the ground, appeared to have been plastered up with cow-dung, or something resembling it.

"I was, however, fortunate at the close of the same month (April 1868). On my lawn, surrounded by other trees, stood a noble sissoo-tree (*Dalbergia sissoo*) ; and where the first great fork diverged was a hole. I had often wished the Hornbills to use this and they, on April 28, made up their minds to do so. The hole was nearly

a foot in depth and roomy inside. On the 29th the female went into the nest and did not come out again.

"The hole being about 10 feet from the ground and opposite my verandah, I could watch everything perfectly with a glass.

"On April 30th I observed the female working hard at closing the orifice with her own ordure. This she plastered right and left with the flat side of her beak, as with a trowel.

"I never saw the male bring anything but food. The male bird would alight near, then fly to the hole and knock with his beak. On this, the points of that of the female appeared and received the food, when the male flew off.

"The hole was at first perhaps 6 inches in height and 3 or 4 wide. When closed up, the opening at the widest part was a little larger than would admit a finger. The plastering operation took two or three days, after which the ordure was thrown out.

"The natives, who know the habits of these birds well, told me that the female digs herself out directly her newly-hatched young need food."

Horne learnt much by his observations, but on the 7th May he took the three eggs the nest contained, so that all further details as to incubation etc. and whether the female did dig herself out were lost.

The above description would do for almost all the nests of this bird. As a rule they select holes low down, between 10 and 20 feet from the ground and, only exceptionally, much higher than this.

Mr. J. D. Finlay (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 444, 1929) gives some very interesting notes on this bird. He found a nest 25 or 30 feet up in a Mango-tree which he opened up on May 13th and took the two fresh eggs which were in it. On June the 2nd, 6th and 16th he paid further visits to the nest. Each time no eggs were found, though the female was inside and "*had repaired the blocking of the entrance.*" The last time she was taken away, and it was found she had moulted her primaries, the new quills being half developed. There were no signs of more eggs in the ovaries, so that in this instance the hen bird must have shut herself in *until it was safe* for her to come out with her powers of flight fully restored.

It has often been asked what is the object of blocking up the entrance to a nest-hole when a bird of the defensive power of a Hornbill indulges in it. The Hornbills, however, have very powerful enemies in the shape of the larger snakes and lizards with which they certainly could not cope unaided, and I have no personal doubt that protection against these is the *raison d'être* of the masonry work.

General Osborne's note on this subject (*op. cit.* vol. xiv, p. 715) show that not only does the hen bird moult her wing-quills during incubation but that at this period she is not physically at her best for protective fighting.

The breeding season is from the middle of March to the end of May, most birds laying in April.

The normal clutch of eggs is three, though Hume speaks of seeing four young birds and that, though he has not seen as many as five, such a number has been reported.

Thirty eggs average 41.9×30.0 mm. : maxima 46.0×32.0 mm. ; minima 39.1×29.2 and 39.2×27.5 mm.

Tockus griseus.

THE MALABAR GREY HORNBILL.

(1576) **Tockus griseus griseus** (Lath.).

THE MALABAR GREY HORNBILL.

Lophoceros griseus griseus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 303.

Tockus griseus griseus, ibid. vol. viii, p. 679.

This small Hornbill is found from South Travancore up the South-West of India as far North as Khandesh.

Curiously enough the breeding of this little Hornbill, although so common a bird, was not known in Hume's time. It is plentiful not only in deciduous forest but also in well-wooded cultivated country, tea estates and even in gardens.

In its breeding habits it very closely resembles the preceding bird except that it sometimes selects trees in forests for nesting purposes. The nest-hole is generally low down in large trees, somewhere between 10 and 30 feet, the entrance being plastered, as usual, with a sort of clay, just leaving enough room for the hen bird to put out the end of her bill to be fed by her attentive mate.

Bourdillon says that "it loves open forest between 1,000 and 4,000 feet in Travancore, but is more common below than above 2,000 feet and actually sometimes occurs and breeds in the plains."

Davidson found it breeding as far North as Kanara in February and March.

It breeds from January to early April, most eggs being laid in February. Bourdillon says that as a rule three eggs are laid, but Stewart took a good many sets of four round Aneichardi.

Fifty eggs average 41.8×30.3 mm. : maxima 46.0×31.2 and 42.4×31.8 mm. ; minima 35.5×27.0 mm.

(1577) **Tockus griseus gingalensis** (Shaw).

THE CEYLON GREY HORNBILL.

Lophoceros griseus gingalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 304.

Tockus griseus gingalensis, ibid. vol. viii, p. 679.

This form of the Grey Hornbill is confined to Ceylon, where it frequents denser forests than does its more Northern representative,

at all heights from about 1,000 to 4,000 feet, though it is found over much of the plains country also.

There is nothing on record about this bird's breeding except that Wait says: "It breeds from April to August in the fashion peculiar to the family. The two or three dingy white eggs measure about 1.62 by 1.29 inches."

Jenkins obtained three eggs for me on the 10th March which were laid in a natural hollow in a dead palm. The entrance had been closed up with "clay," presumably the bird's own excrement, leaving an opening just big enough for the female to put out the end of her bill and receive the food her mate brought her. The three eggs measure 39.0×22.9 , 37.4×21.0 and 38.3×20.0 mm.

They are of the usual coarse texture, originally white but considerably stained.

Family UPUPIDÆ.

(HOOPES.)

Upupa epops.

THE HOOPOE.

(1579) *Upupa epops epops* Linn.

THE EUROPEAN HOOPOE.

Upupa epops epops, Fauna B. I., Birds, 2nd ed. vol. iv, p. 308.

The European Hoopoe breeds within our limits from the boundaries of Afghanistan through Kashmir to the higher valleys of the Simla States and Garhwal and possibly also to Western Nepal, where it meets the Eastern high mountains form *saturata*.

It is a very common breeding bird between 5,000 and 10,000 feet elevation and less common up to some 14,000 feet. In Ladak Osmaston says that it is common between 9,000 and 13,000 feet and on the North-West Frontier it occurs and breeds at similar elevations.

It is a bird of the open country, preferably of such as is well wooded, as trees form favourite breeding sites, but also in open, almost treeless country. It also occurs in thin forest, and I have one record of a nest made in a hole in a large Deodar growing in dense forest of mixed Deodar, Oak and other trees.

The nest itself may be placed in a hole in any place or position. The majority, perhaps, are placed in natural hollows in large trees, at no great height from the ground, most being between 3 and 15 feet. I have records, however, of nests up to 40 feet, while Jones found one in a Deodar only a foot above the ground.

In some places, such as parts of Ladak, round Srinagar in Kashmir and in the immediate vicinity of Simla the birds often select stone walls, nesting in the holes from which stones have fallen out or in between two or three big stones where there is no earth or plaster. Occasionally they select holes in walls of buildings, and even breed in, and under, the thatch roofs of houses, both empty and occupied.

The nest varies from nil to a dirty untidy mass of rubbish of all kinds, vegetable and other. Buchanan writes of two nests:—"These were both taken from holes in retaining walls in precisely similar positions on the same day. One clutch reposed on the bare dust and litter between the stones, while the other eggs were hidden in a nest which consisted of several handfuls of evil-smelling rubbish, rags, straw, bits of wool, grass, feathers, leaves etc." So, too, Osmaston found two clutches of eggs, one in a stone wall round a field and one in a stone revetment wall near a bridge, both laid on the bare earth, while a third was in a hole in a tree laid in a "large nest of all sorts of oddments."

Many writers have commented on the unpleasant smell the nests of these birds almost invariably possess, accentuated, of course, when more massive and also as incubation advances. The smell is very strong when the eggs are hatched and even the eggs retain the smell for some time after they are blown.

The breeding season is April and May and in India the bird does not appear to be double-brooded. Eggs have been taken in June, but this is exceptional and very likely due to a first clutch having been destroyed.

The number of eggs laid is from six to eight, but as few as four eggs are sometimes incubated, while eight or nine are sometimes laid and, in Europe, twelve eggs have been taken from a nest.

When first laid the eggs vary from a creamy white to a pale blue-green, very pale olive or very pale fawn. As incubation advances the eggs deepen in colour, in addition to which they often become very stained, some becoming a uniform dull chocolate-brown, deep olive-brown or dirty fawn-brown. In the same clutch the individual eggs often vary greatly, some more or less retaining the original colour and others becoming deeply or patchily stained.

One hundred Indian eggs average 26.1×17.5 mm.; maxima 28.6×18.1 and 25.3×18.5 mm.; minima 23.1×17.2 and 26.0×16.3 mm.

In shape they are long true ovals, the texture hard and fine but not close, and it is this porous surface which makes them so easily stained.

The female alone incubates, and from the time the second or third egg is laid she seldom leaves the nest and, after the last egg is laid, never does so until they are all hatched. The male is very attentive to his sitting wife and feeds her continually on the nest.

I have been told that incubation takes fourteen to fifteen days but, personally, have no knowledge as to how long it lasts.

(1580) *Upupa epops saturata* Lönnerberg.

THE TIBETAN HOOPOE.

Upupa epops saturata, Fanna B. I., Birds, 2nd ed. vol. iv, p. 310.

In India this is the form of Hoopoe breeding in Sikkim, while North of this it extends to the Yenesei and thence East to Mongolia and Manchuria. It is very common in Tibet, Setzchuan and the higher ranges of Northern China.

It breeds certainly up to 14,000 feet and almost certainly up to 16,000 feet; on the other hand, I have no record of its breeding below some 12,000 feet, though it may do so in Sikkim.

In its nesting habits it differs but little from the European bird. Generally the nest is made in holes in walls, either those dividing the fields or retaining the roads etc., or in those of both occupied and unoccupied buildings. Often they are placed in between the rafters, and they have been known to build in holes inside the houses and within reach of the hands of the many occupants. Occasionally holes in trees are chosen as nesting-sites and, about equally often, holes in banks.

As might be expected at such great elevations, the nest is normally a bulky one and, according to Steen, Kennedy, McGregor and others, the eggs are never laid on the bare earth. The nests are said also to be almost invariably well lined with wool. They have the same fetid smell as the nests of the preceding race, one which adheres to the eggs also for some weeks after they have been taken and cleaned.

The breeding season is but little later in Tibet than it is in Kashmir, and I have eggs taken as early as the 6th April, my latest date being the 30th June. The majority of birds, however, lay in late April and early May.

The number of eggs laid varies from five to nine, generally seven or eight.

They go through the same range of variations as do the eggs of the European Hoopoe, but average a good deal darker and more often stain deep olive-grey rather than brown, probably due to some variation in the materials upon which they lie.

Sixty eggs average 26.3×18.3 mm. : maxima 29.1×21.0 mm. ; minima 24.2×17.3 and 25.0×16.0 mm.

In shape they are long ovals but are broader, more bulky eggs than those of the preceding bird.

Like all Hoopoes, the hen bird of this species sits very closely and can generally be captured on the eggs, though she bites savagely at the hand which holds her.

They are said to return year after year to the same hole in the occupied houses of the Tibetans, who never interfere with them.

(1581) *Upupa epops orientalis* Stuart Baker.

THE INDIAN HOOPOE.

Upupa epops orientalis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 311.

This subspecies of Hoopoe is found over the whole of Northern India, ascending only the foot-hills in North-Western India, but in Sikkim to Western Assam being found up as high as 7,000 feet, though perhaps not very often. South this bird gradually grades into the more richly coloured Ceylon birds, gradually also decreasing in average size. It is impossible to define any actual line of demarcation between the two but, arbitrarily, we may accept a line from the Bombay Presidency, say about Khandesh, to the Northern Deccan and then South-West to Central Madras Presidency. Central Provinces birds and those of Poona are definitely of the Northern form, as are those of South Orissa. About Ferozepore the birds are very small but are not of the typically rich colour of Ceylon birds.

As regards their nidification there is little to add to what has already been said about the two preceding races. Many birds breed in holes in banks as well as in all the other kinds of holes already recorded. In Saharanpur Marshall (G. F. L.) says:—"The eggs are laid in holes of trees, or among the rafters of houses, and often in the nooks and crannies formed by twisted suckers of the banyan-trees (*Ficus indica*); if in the roof of a house the eggs are generally laid on a little layer of rubbish and thatching-grass, but in trees no attempt at lining the hole is made."

Adam found a nest in Oudh "built in a hole in the mud gable-end of an inhabited house, about 5 feet from the ground," while Inglis records a nest "found on the floor of a house amongst some *bhusa* (chaff)."

As in the highest elevations we find the most bulky and warmest nests, so in tropical India we find that lining to the holes is either entirely dispensed with or, at most, a very poor nest is made. This may be of a little grass, a few leaves or weed-stems, a little wool or hair, while in one case it consisted of nothing but some human hair.

They are early breeders, most birds laying in March and early April, but in Bihar some birds lay in the end of February, while in some other places they continue to lay through early May. They are not double-brooded, but if the first clutch of eggs be destroyed they will often lay again.

The eggs number four to six, occasionally seven, five being the number most often laid.

One hundred and twenty eggs average 24.6×16.5 mm. : maxima 26.0×19.0 mm. : minima 21.3×17.1 and 22.8×15.3 mm.

The birds return year after year to the same hole for nesting purposes. The female is, as with all the species of this genus, a very close sitter, being easily captured by hand. The nest, eggs and young birds have the usual offensive smell, and this bird supplies

one of the rare instances in which the female bird not only fails to remove the droppings of her young from the nest but actually leaves her own therein also.

Fletcher and Inglis, in their work 'Birds of an Indian Garden' (p. 129), quote the results of Mason's watching a pair of Hoopoes feeding their young "almost entirely on caterpillars, grubs of *Melolonthids* and crickets," and relate how in one hour the parents visited the nest fifty-eight times, while on another occasion two hundred and eighty-six visits were paid between 6 A.M. and noon.

(1582) *Upupa epops ceylonensis* * Reichb.

THE CEYLON HOOPOE.

Upupa epops ceylonensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 312.

This, the smallest and darkest race of Hoopoe, is found in Ceylon and in South India south of the imaginary line drawn as the southern limit of *orientalis*.

In its habits it is the same confiding bird of open country, cultivated fields, gardens, parks and orchards and, like other Hoopoes, it breeds in the vicinity of human beings and often in their houses.

The birds build in the same kinds of places as those already mentioned. Packard also took five eggs from an empty box which the birds entered through a hole in the side. There was no nest, the eggs laying on the bare wood. Williams also found one nest in an unusual place, the birds having laid their eggs, five in number, in a hollow in between the great bifurcating boughs of a large tree. Another bird was found by Dr. Percy Rendall breeding in the Royal Courts of Justice at Madras, laying six eggs in a hole in the brickwork of the outside gallery.

The breeding season is from the end of February to early April.

Four or five eggs are laid and but rarely six. These go through the same range of variation as do those of all the other races. I have really rather a poor series of these eggs in my collection, yet the following shades of colour are represented: very pale grey-white, equally pale fawn-white, bright pale blue, rather deep grey-blue, deep fawn-brown and deep olive-grey.

Forty eggs average 24.3×16.3 mm.: maxima 26.0×16.4 and 24.5×17.3 mm.; minima 21.7×15.5 mm.

I have no Ceylon eggs, but Wait gives the average of these as 24.4×16.7 mm. and says that the breeding season lasts from November to April; but it must be noted that Layard shot young birds in August. It may be that Ceylon birds have two broods, though it is more likely that Ceylon Hoopoes, like many other Ceylon birds, have a very long and very irregular breeding season.

* Ticehurst says the name should be *nigripennis* Horsf. & Moore, Cat. ii, p. 725. This, however, was published 1856-8, whereas *ceylonensis* of Reichb. was published in 1853, or three years earlier.

(1583) *Upupa epops longirostris* Jerdon.

THE BURMESE HOOPOE.

Upupa epops longirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 312.

The Burmese Hoopoe extends from Eastern and Southern Assam throughout the whole of Burma, Siam and the Indo-Chinese countries to Hainan and South to the Malay Peninsula.

There is no difference in the nesting habits of the various Hoopoes.

Oates in Pegu and Darling in the Malay Peninsula both found nests in February and March in holes in trees round about villages, and the former also found some young "in a hole of a large forest-tree about 15 feet from the ground." With this race such a site is not exceptional, and I found several nests either in cultivated land surrounded by forest or in holes in trees actually inside forest. Another rather curious site, but one much affected by birds in tea-gardens, is in among the great masses of timber logs cut down and stacked close to tea-factories to use as fuel. In the Khasia Hills I also took nests from holes in retaining walls.

The breeding season is February to the end of May, most birds breeding in March and April.

Fifty eggs average 24.9×17.9 mm.; maxima 26.6×18.2 and 25.8×19.1 mm.; minima 22.0×17.2 and 24.1×16.3 mm. A huge double-yolked egg taken by Livesey in the Shan States measures 30.0×18.3 mm.

Suborder TROGONES.

Family TROGONIDÆ.

(TROGONS.)

Harpactes fasciatus.

THE CEYLON TROGON.

(1584) *Harpactes fasciatus fasciatus* Pennant.

THE CEYLON TROGON.

Pyrotrogon fasciatus fasciatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 316.

Harpactes fasciatus fasciatus, *ibid.* vol. viii, p. 680.

This Trogon is restricted to Ceylon, where it is found throughout the island in dense tree-forest.

Very little is known about the breeding of this bird. Wait says ('Birds of Ceylon,' 2nd ed. p. 201, 1931):—"The breeding season

is March to May. Two or three very glossy, pale, buff eggs are laid in a hollow in a rotten stump 6 to 12 feet off the ground.

"Five Ceylon eggs are all very spherical and measure 1.01 by .96" (=about 25.6×24.4 mm.).

Phillips obtained a clutch of three eggs near Mousakande at an elevation of about 3,500 feet. Of these three eggs one was infertile and two rather hard set, and they were taken on the 12th April from a natural hollow "in a tree in heavy jungle."

They measure 25.3×25.0 , 26.3×25.0 and 25.5×25.3 mm. It would be difficult to find eggs more truly spherical than these.

They are of the usual pale *café-au-lait* or buff colour.

A second clutch was taken by him at the same place five years later in a similar position. These three eggs measure 25.4×24.0 , 25.6×24.6 and 26.2×23.5 mm.

(1585) *Harpaotes fasciatus malabaricus* Gould.

THE MALABAR TROGON.

Pyrotrogon fasciatus malabaricus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 317.

Harpaotes fasciatus malabaricus, ibid. vol. viii, p. 680.

The Malabar Trogon is found from Travancore as far North as Khandesh, Kanara and Belgaum. It also occurs in the hill-ranges of Mysore. In the North it ranges from Chota Nagpore and Western Bengal, South to the mouths of the Godavari.

This is a bird of dense, deeply shaded forests, both those in the plains next the hills and those in the hills themselves.

Davidson obtained several clutches of their eggs in Kanara and Bingham obtained one at Ram Ghat, 30 miles from Belgaum. Mr. Ivor Macpherson also found one in the Mysore District. All these are recorded in Hume's 'Nests and Eggs,' and since then Bourdillon and Stewart have taken many sets of eggs in Travancore.

For nesting purposes the birds select natural holes in dead trees or, more often, in stumps of trees in the gloomiest parts of the forest. The holes are generally not very big but with comparatively wide entrances; sometimes, however, these are not wide enough to admit a hand or arm and have to be enlarged before one can extract the eggs. They are seldom at any great height from the ground; some can easily be reached by hand and few are over 10 feet from the ground, though that taken by Macpherson was said to be 20 feet up. The eggs lie on the bare wood or upon such debris as may be wind-blown into the hollow.

The breeding season is from February to May, Bourdillon and Stewart having taken eggs from the 29th February to the 12th May, while Davidson obtained a clutch on the 17th of the latter month.

The number of eggs in a clutch is two to four, but two only seems exceptional. In Hume's 'Nests and Eggs' all the recorded eggs are described as "pure white," but they are, of course, a pale but

quite definite buff, very highly glossed and of the normal spherical shape of all Oriental Trogons' eggs.

Thirty eggs average 28.7×23.4 mm. : maxima 28.0×24.0 and 27.4×25.0 mm. ; minima 24.2×22.7 and 26.2×22.2 mm.

There is nothing on record about incubation and I have not heard of a male being caught on, or shot off, the nest.

Harpactes erythrocephalus.

THE RED-HEADED TROGON.

(1586) **Harpactes erythrocephalus erythrocephalus** Gould.

THE BURMESE RED-HEADED TROGON.

Pyrotrogon erythrocephalus erythrocephalus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 318.

Harpactes erythrocephalus erythrocephalus, ibid. vol. viii, p. 680.

This fine Trogon is found in the sub-Himalayas from Nepal and Eastern Assam and thence through Manipur, Lushai, the Hill-Tracts of Eastern Bengal, and over the whole of Burma as far South as Tenasserim.

This Red-headed Trogon is common, though but seldom seen, in most deep evergreen forest between 1,000 and 2,500 feet, but it is also resident in the plains next the foot-hills and in the hills themselves up to 4,000 and exceptionally up to 5,000 feet. I never found it breeding in thin bamboo-jungle, but Gammie found a breeding-hole in thin mixed bamboo- and small tree-forest in Sikkim at about 2,000 feet elevation. Oates in Pegu and Bingham in Tenasserim also found their nests in forest only.

I took many clutches of eggs in the hills South of the Brahmaputra and it was equally common in Lakhimpur. It almost invariably selects as a breeding site a natural hole in some very rotten tree, not too big or too small to be both warm and comfortable. The entrance is generally a wide one but, occasionally, the birds will enlarge an entrance which is too small to suit them, or, still more occasionally, they will make a nest-chamber for themselves but, in such cases, they choose a tree so rotten that one can tear it to pieces with the fingers. Two or three times I have known deserted Woodpeckers' or Barbets' nest-holes taken possession of, and Coltart also found a similar instance on one occasion. The hole selected is most often between 5 and 15 feet from the ground, sometimes a little higher, rarely a little lower. There is no nest, and the eggs lie on the chips of touchwood or on any débris which may have been blown into the hole.

The breeding season is generally May and June, but I have taken eggs from the 14th of April to the 17th July and one on the 4th August. They are not double-brooded so far as I know but, if the eggs be taken, they will at once lay again and, usually, in the same

hollow. They sit close, both sexes incubating and both sometimes being found in the nesting-hole together. In the dark woods one often fails to notice the bird as it slips silently out of the hole, though attention is generally attracted by its little mewling cry as it flies off.

They lay three or four eggs, one number as often as the other ; these are the usual buff in colour, and are typical in shape and texture.

Eighty eggs average 28.6×24.0 mm. : maxima 33.0×23.2 and 29.5×25.7 mm. ; minima 26.1×24.5 and 29.0×22.0 mm.

(1587) *Harpactes duvauceli* Temm.

THE RED-RUMPED TROGON.

Pyrotrogon duvauceli, Fauna B. I., Birds, 2nd ed. vol. iv, p. 319.

Harpactes duvauceli, *ibid.* vol. viii, p. 680.

Within our limits this Trogon occurs in Tenasserim, from whence it extends throughout the Malay Peninsula to Borneo.

In its breeding habits it differs in no way from the other species, keeping to dense forest and breeding in natural hollows in trees at no great height from the ground.

In February 1913 Kellow took three eggs from a "hollow in an old stump standing beside a stream in evergreen forest near Simpang in the Fed. Malay States." Curiously enough, on the 23rd of April the same year Major Moulton took another clutch of two eggs in Borneo "laid in a hole in a dead tree, about 12 feet from the ground in heavy forest."

These five eggs are, strange to say, practically pure white, though one of the five has the faintest creamy tinge. They are, of course, very small compared with those of the larger Trogons, and the five average only 23.7×19.9 mm. : maxima 25.0×19.7 and 24.3×20.2 mm. ; minima 20.3×19.3 mm.

Harpactes oreskios Temm.

THE YELLOW-BREASTED TROGON.

(1588) *Harpactes oreskios uniformis* Robinson.

THE MALAY YELLOW-BREASTED TROGON.

Pyrotrogon oreskios uniformis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 321.

Harpactes oreskios uniformis, *ibid.* vol. viii, p. 680.

Robinson's Trogon, by which name this bird has hitherto been known, occurs from Tenasserim to the South of the Malay States.

Robinson sums up their habits thus ('Birds of Malay Peninsula,' vol. ii, p. 70, 1923):—"This Trogon is found in damp evergreen

jungle, at an elevation from 2,000 to 4,000 feet, rarely higher or lower. In the more Northern districts it is found at much lower heights, often only 200 or 300 feet, but always in hilly country, and sometimes affects much drier and more open country." Davison found it practically in the open in isolated clumps of trees.

As this Trogon differs a little from other Trogons in its nidification I quote Davison's description in full:—"On the 11th February I took my first nest of *Harpactes oreskios*, containing two fresh eggs. The eggs were laid on a few chips of decayed wood at the bottom of a hole scooped out (evidently by the bird) at the top of a decayed stump about 4 feet high, and was placed on the very edge of a path. The following day I took two more nests, each containing three eggs slightly incubated. One was in an exactly similar position to the first nest, but the other was in a bit of dead wood, about 9 inches long, that was stuck in a creeper, and was about 12 feet above the ground.

"There is no doubt that the nest-holes are hollowed out, or at any rate enlarged, by the birds themselves. I found several more nests, and in one instance actually saw the hen Trogon at work excavating the hole. A very rotten stump is chosen, so that the bird can without difficulty chip out the wood."

Bingham found a nest in a very curious position for that of a Trogon. He says that it was a cup-shaped hollow on the upper side of a branch not 12 feet from the ground. The tree itself was on "the very border of the high road (though it is a mere pathway after all) from Maulmain to the Shan country."

Later he found other nests, "mere hollows scraped or worn away in decayed branches or stumps of trees."

Hopwood found all his nests in holes *inside* rotten stumps and says that they were "in shape and size like a cocoa-nut scraped out by the birds themselves and nearly always by a path."

The breeding season seems to be restricted to February and March, every recorded egg having been taken between 11th February and 11th March.

Two to four eggs are laid, typically buff in colour, round in shape and very glossy in texture.

Eleven eggs average 26.3×21.3 mm.; maxima 27.4×21.3 and 27.1×22.0 mm.; minima 25.2×21.3 and 25.4×20.7 mm.

Suborder CYPSELLI.

(SWIFTS.)

Family MICROPIDÆ.

(SWIFTS.)

Subfamily MICROPINÆ.

(TRUE SWIFTS.)

Micropus melba.

THE ALPINE SWIFT.

(1589 a) **Micropus melba bakeri** Hartert.

THE INDIAN ALPINE SWIFT.

Micropus melba melba, Fauna B. I., Birds, 2nd ed. vol. iv, p. 324 (part.).
Micropus melba bakeri, ibid. vol. viii, p. 680.

A sedentary form of the Alpine Swift undoubtedly breeds in Southern India, but no authentic egg has yet been taken, as that sent by Miss Cockburn to Hume as an egg of the Alpine Swift is far too small for that of this bird.

Davidson and Wenden, writing of the Deccan, say:—"Permanent resident in Satara. Breeds, D. thinks, about the cliffs and on old buildings in the fort there." In a letter to me Davidson says the same, and adds that, though he has had no luck, he is quite convinced they breed there. McMaster saw the birds about the Chikalda fort, evidently breeding in the adjacent precipices, while I have also had repeated reports that it breeds about the Gairsoppa Falls.

(1592) **Micropus acuticaudus** (Blyth).

THE KHASIA HILLS SWIFT.

Micropus acuticaudus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 327.

So far this Swift has only been found in Nepal, once by Blyth, and in the Khasia Hills. In the latter it is a breeding visitor only. Where the real habitat of this bird is has not yet been discovered, but may possibly be in the practically unknown hills from Bhutan East to the Abor country in North Lakhimpur.

In the Khasia Hills the birds generally appear in their breeding haunts in the last week of February or the first week of March,

remaining until the young are ready to fly at the end of June or early July. By the end of July nearly every bird has gone, though no one knows where. Even in the Khasia Hills their breeding area is very confined, being restricted to the deep rocky cliffs and gorges about Cherrapoongi and facing the Sylhet plains. Here the cliffs rise very abruptly from the foot-hills, towering sheer up for some 4,000 feet, catching and breaking every cloud and enjoying the reputation of having the heaviest rainfall in the world, an average of something over 500 inches a year. In these cliffs the birds select some perpendicular sheet of rock, broken into crevices and cracks, in which they build their nests in colonies of a dozen or twenty pairs. Several nests may be built in the same crevice or there may be only one or two. The nests are like those of the European Swift and are composed of all kinds of wind-swept rubbish, such as straw, feathers, small leaves and twigs, seed-down etc., all matted and stuck together with saliva and then lined with the same. The nests are used year after year and become very filthy and verminous, the vermin, some of great size, crawling all over young and old birds alike. In shape the nests vary greatly to fit the position in which they are built. Most of them, resting on ledges, are shallow saucers, anything from 4 to 7 inches in diameter by 2 or 3 deep. When, as often happens, two or more touch one another, one wall between the two nests suffices and the diameter is very small, but single nests are often large and straggling. Nests placed in small deep hollows conform to the latter in shape and may be deep cups or inverted cones up to 6 inches in depth.

The breeding season is very regular and commences in the last week in March and finishes a month later. If eggs are taken, however, the birds lay again in their old nests and stay on until the second brood can fly, which may be late in August, a fact which would lead one to believe that they cannot migrate far. Moreover, flocks of Swifts appear at intervals for brief periods which may be of this species, a fact not ascertainable unless specimens are shot, for Swifts on the wing, very high overhead, are not easy to identify.

They lay two to four eggs, the latter number being not uncommon, though three is the usual full clutch.

The eggs are, of course, pure white with a rather coarse grain and unglossed surface, while in shape they are long, generally blunt ovals, like all other Swifts' eggs.

Fifty eggs average 26.0×16.3 mm.: maxima 27.1×16.2 and 26.4×17.0 mm.; minima 24.3×16.8 and 25.0×14.9 mm.

I think both sexes incubate, as my men caught both in nooses set at the nest. This, however, is not conclusive evidence with this species as both birds often sit together and the cocks may have been noosed although not actually sitting. Both sexes certainly assist in collecting material for the nest and in feeding the young.

***Micropus pacificus* (Lath.).**
THE WHITE-RUMPED SWIFT.

(1594) ***Micropus pacificus cooki* (Harington).**

THE BURMESE WHITE-RUMPED SWIFT.

Micropus pacificus cooki, Fauna B. I., Birds, 2nd ed. vol. iv, p. 330.

Apparently this is a sedentary form of the White-rumped Swift found in suitable country from the Kachin Hills and Shan States through the hills of Burma and the Malay States.

This Swift is extremely common in the Shan States. It was discovered by J. P. Cook breeding in vast numbers in the caves in Gotiek Gorge, while later Harington also found it breeding there, and writes about them as follows (Journ. Bomb. Nat. Hist. Soc. vol. xxiii, p. 156, 1914):—"In June I found the Burmese Swifts breeding in thousands in the Gotiek caves, which form a natural bridge through which the river flows and over which is constructed the railway viaduct (which is said to be the highest railway bridge in the world). All the nests were inaccessible without the aid of ladders, being built against the roofs or sides of the caves overhanging the river. Although so well protected from enemies from below, they appear to be victimised by bats, which simply swarm in the caves, as I picked up a number of eggs which had clearly been sucked. I also picked up a fully fledged young bird and a nest. This was saucer-shaped and composed of leaves and grasses, lined with a few feathers, the whole being cemented together with saliva. I have been told that they also breed in the railway tunnels on the far side of the Gorge."

In 1932-3 T. R. Livesey found these Swifts breeding in fissures in the earth in the crests of the Shan Hills at 5,000 to 6,000 feet, and also using old nests of *Hirundo d. striolata* which bred also in the many caves in these same hills. From these nests he obtained one clutch of three eggs and another of two.

The breeding season is evidently April, May and June, as Harington found remains of fresh eggs and fully fledged young birds in June and Livesey fresh eggs twice in May.

The five eggs I have in my collection and referred to above vary in size from 25.2×17.0 to 23.3×15.2 mm. They are of the long oval shape typical of the family.

Although these birds may scatter a good deal for two or three months in the year, there is little doubt that they will eventually be found breeding over a very wide area in the mountains, probably wherever there are suitable caves, rock-clefts and fissures in which they can build their nests.

(1595) *Micropus pacificus leuconyx* (Blyth).

THE HIMALAYAN WHITE-RUMPED SWIFT.

Micropus pacificus leuconyx, Fauna B. I., Birds, 2nd ed. vol. iv, p. 331.

This Swift is found over the greater part of the Outer Himalayas from Murree to Assam. It quite probably also breeds further West to the Afghan and Baluchistan frontiers, but Swifts are hard birds to determine and, even if seen, are not usually identified unless one tracks them home to their breeding places.

They seem almost invariably to breed in deep narrow crevices in rocks and cliff-faces, so that even when found the nests are often impossible to reach. Rattray first recorded the breeding of this bird near Murree (Journ. Bomb. Nat. Hist. Soc. vol. xvi, p. 660, 1903) under the name of *Cypselus melba*. The nests, he says, "were not as described, but far inside a crack in solid rock, on face of a precipice. I could not get my arms in, but caught one young bird as it flew out." Later Rattray and also Buchanan obtained nests and eggs and sent me the parent birds to identify, when they were found to be of the present species. In every case the nests were deep inside clefts in rocks and very hard to get at. Of one colony Rattray wrote me:—"I could see the group of nests but the cleft was so narrow and deep we could not get at them. I did, however, get out one pair of eggs, and returned the next day with a net on the end of a stick and got this pair (which I send you). As I remarked overleaf, they are very small, but the birds repeatedly passed very near me and I shot one."

Buchanan also took some clutches near the same rocks in quite similar positions, while in Mussoorie Mackinnon took eggs from nests built in the same kind of places.

In Shillong I was much surprised to find these birds breeding, and here also they selected crevices in great boulders and rocks in which to place their nests. Some birds nested in between the two sides of a great rock which appeared to have been torn asunder for its whole depth. It reared out of the side of the sloping hill for a height of some 25 feet, the rift at the top being about 2 feet wide, diminishing to an inch or two at the bottom. When I first found it the only nest I could reach contained two young birds, but the following year a nest built in the same spot had three eggs, which I secured.

Whympere took a clutch of three eggs from one of a cluster of old nests of *Chelidon nepalensis*, built against a cliff-face at about 4,000 feet, near Naini Tal. The nests found by Rattray, Buchanan and myself were all just like those of *Cypselus subfurcatus*—half-cups or cups, made of all sorts of small rubbish, chiefly tiny twigs and broken chips of leaves, bound together with the birds' saliva. In every case the nests were quite separate from one another, though Rattray and Buchanan both found little groups

of nests, two to five in number, built in a very small space but never touching one another like the nests of *Micropus affinis* often do.

The breeding season is a long one. Buchanan obtained a pair of eggs on the 12th April near Murree, where Rattray and he both obtained eggs in July also, while Whympers found them breeding at Naini Tal on the 18th May.

The full clutch of eggs is two or three, and they are typical Swifts' eggs in all respects.

Eleven eggs average 22.7×15.0 mm. : maxima 23.3×14.8 and 22.2×15.4 mm. ; minima 22.0×15.4 and 22.9×14.2 mm.

Both Buchanan and Rattray took a clutch of pigmy eggs of this Swift, one of three and one of two eggs, which measure from 17.2×12.8 to 20.4×12.7 mm. These are not included in the average measurements given above.

***Micropus affinis*.**

THE INDIAN HOUSE-SWIFT.

(1596) ***Micropus affinis affinis* (Gray).**

THE COMMON INDIAN HOUSE-SWIFT.

Micropus affinis affinis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 332.

The Indian House-Swift is a resident bird wherever found, though subject to small local movements. It occurs in the North-West Provinces but not on the Afghan and Baluchistan boundaries. It is the breeding form over the whole of the Punjab except, perhaps, a small area in the South-West, extending South to Bombay City, Belgaum, Rajputana, the Deccan and Central Provinces. In the Himalayas it occurs, up to some 7,000 feet, as far East as Garhwal and, in the plains, to Bihar and Western Bengal.

Although the notes in Hume's 'Nests and Eggs' refer to all the races of this Swift, his summing-up of the nidification can hardly be improved on, and applies equally to one and all the subspecies. He writes :—

"It has at least two broods in a year, and eggs may be found any time from February to August, both months included.

"It is very capricious as to its choice of a nest-site, but having once secured one to its liking, returns thither with a pertinacity that no ordinary persecution in the way of robbing and destroying nests will overcome. They breed in company, solitary nests are, so far as my experience goes, unknown; from a dozen to fifty pairs will be found nesting together; the nests either clustered together in one dense mass, as when they choose the roof of some little cave, or the interior of some old Moslem dome or Hindoo shrine, or else scattered about in little groups, in close proximity, as when they occupy a verandah, and each pair of rafters has its half-dozen nests. Perhaps on the whole it prefers inhabited to deserted buildings, but I have found its nest a hundred times in both.

"The nests vary very much in size, shape and material. I have taken them from between two very closely set rafters in a railway-station, long half-tubes a foot in length, some 4 inches in external diameter, composed wholly of feathers cemented together with saliva and nearly $\frac{1}{2}$ inch in thickness. Two now before me are large masses, 10 by 6 and $2\frac{1}{2}$ to 3 thick, of grass in which many feathers of doves, parrots, peafowl, sarus, duck, some little sheep's wool, and a bit or two of twine are all mingled. The bottom portions are a good deal cemented together by saliva but the interior is by no means hard or smooth; others again are much smaller, globular, and having the whole of the materials agglutinated together.

"In the plains they are not generally lined, but in the hills they often have a warm lining of grass and feathers."

Hume says that it breeds up to 6,000 feet in the Himalayas, but in the Simla States it nests up to 7,000 feet.

The only type of nest described, not mentioned by Hume, was obtained by Adam, who writes of nests found at Sambhur:—"Some had openings at the side, while others had tubular-shaped necks, about 2 inches long, projecting from the side of the nests." These were not usurped nests of Swallows, for Adam goes on to say: "The nests were composed of pieces of straw, fine twigs, cobwebs, and fluffy feathers, all agglutinated together, with here and there some bright-coloured feathers of a Parrot or a Roller stuck carelessly on the outside."

The inside of the nest is often hard and finished off with saliva. Jerdon says:—"The inside of the nest is hard, glistening and smooth, and feels, says Theobald, 'like coarse cardboard'."

Sometimes, however, even in the plains, there is a good lining of soft feathers; Aitken (J.) speaks of such linings, and Adam says: "The egg-cavity had a lining of feathers and the entrance was lined with fluffy feathers."

Betham found them usurping the nests of Swallows in Baroda on several occasions.

Eggs have been taken from early February to the end of September, and many birds have two broods in the year, perhaps more.

The number of eggs is normally two or three and in many colonies more than two is exceptional. At the same time four eggs are often laid. J. M. Ollenbach obtained many clutches of four in Jamalpur; Dodsworth obtained four at Simla and Barnes took one clutch of five eggs from a nest built in a house in Bombay City.

One hundred eggs average 22.2×14.2 mm.; maxima 24.1×14.2 and 22.0×15.1 mm.; minima 20.1×14.0 and 23.0×13.0 mm.

They are typical long, narrow white eggs, with a rather fragile shell for their size.

Both sexes incubate and both assist in building the nest.

Witherby quotes Steele to the effect that the incubation of the Common English Swift is at least eighteen days, but that of the present bird is, I am practically sure, only fifteen days (see *M. a. nipalensis*).

(1597) *Micropus affinis galilejensis* Antinori.

THE PALESTINE HOUSE-SWIFT.

Micropus affinis galilejensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 334.

The present race occurs in India in Sind, Baluchistan, the Afghan-North-West Frontier and the South-West Punjab. Its extra-limital breeding range is Palestine to the Caucasus and Persia, South to Afghanistan.

Nests and nesting habits differ in no way from those of the preceding bird.

Butler found it breeding in numbers in the main streets of Karachi City in big colonies and also on the Oyster Rocks in Karachi Harbour. Ticehurst found "small colonies under ledges of cliffs in the desert" (Ibis, 1923, p. 35), and Eates tells me "they breed everywhere just as Butler describes."

They breed practically throughout the year. Butler got fresh and hard-set eggs on the 10th March, now in the British Museum, while Eates has obtained fresh eggs as late as the 3rd of October.

The number of eggs laid seems always to be two only and I have no record of three.

Twenty eggs average 22.4×14.2 mm.; maxima 23.7×14.6 and 23.4×14.7 mm.; minima 20.6×14.1 and 21.1×14.0 mm.

(1598) *Micropus affinis nipalensis* (Hodgs.).

THE NEPAL HOUSE-SWIFT.

Micropus affinis nipalensis, Fauna B. I., Birds, 2nd ed. vol. iv. p. 334.

This race of House-Swift has a most curious distribution, and better breeding material may enable Southern, Northern and Ceylon races to be discriminated. It occurs from Nepal East to Bhutan and possibly Western Assam. Thence it is found South through Central and East Bengal to Orissa and Madras and again West through the Deccan to the Southern Bombay Presidency and South to Travancore and Ceylon. In this island the birds seem exceptionally dark.

In Nepal and Sikkim they breed up to an elevation of about 6,000 feet but leave these heights during the cold weather.

Their breeding habits are the same as those of other races, but Stevens (Journ. Bomb. Nat. Hist. Soc. vol. xxx, p. 676, 1925) has the following interesting note on their nesting in Sikkim:—"This Swift, wherever established in the verandahs of dwelling houses, invariably usurps the bulky mud structures of the Swallow (*H. d. nepalensis*), and having once obtained possession, its occupancy becomes a permanency. At Gopaldhara one such nest has been occupied for ten years, the birds remaining the whole year round. At Okayti, 7. 6. 23, I counted 38 nests, comprising a colony, where

every available site appeared to be occupied under the eaves of an office building."

In Ceylon they breed less exclusively in buildings, and their nests have been taken from caves, railway tunnels, arches of bridges over rivers etc.

In Nepal and Sikkim they breed from April to July; in Bengal I have found eggs from March to early May and again in late June and July, while their eggs have been taken by other collectors from February to September. In Travancore they apparently breed from February to April and in Ceylon principally in February and March, though Wait has taken eggs in July.

In the North they lay two to four eggs, in the South generally two only and but rarely three.

Although I have taken and seen endless eggs of this race I have only measured ten. These give an average of 21.9×14.4 mm.: maxima 22.7×15.0 mm.; minima 20.9×13.9 mm.

These birds used to breed under the eaves of a bathroom in a hotel in Calcutta, where I had an opportunity of timing them. They began nesting operations in March; one nest was repaired and the first egg laid on the 15th and the third and last on the 17th, hatching on the 1st April, *i. e.*, after fifteen days. The birds had not left the nest when I left the hotel twenty-seven days later. Other young hatched a few days before these had left and were flying about with their parents.

As soon as the young left for good the parents laid again, and brought up one or two more broods. Both birds repaired the nest, both incubated, often being in the nest together, and both fed the young ones equally diligently. Young and old returned to the nest nightly to sleep for a few days after the young had begun to fly.

(1599) *Micropus affinis subfurcatus* (Blyth).

THE MALAY HOUSE-SWIFT.

Micropus affinis subfurcatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 335.

The Malay House-Swift occurs and is resident in Assam; Chittagong and Comilla in Eastern Bengal; the whole of Burma, the Malay States, Sumatra, Borneo and Java. East it is found in the Indo-Chinese countries as far as Amoy.

In Assam we found this to be purely a cliff-breeding bird, some of the colonies being of great size, numbering one or even two hundred pairs of birds. They built in very inaccessible places under overhanging rocks on precipitous hill-cliffs, only approachable with ropes and not often even with them. The nests on these cliffs are nearly all of the strong, well made half-cup type. In Burma and China they breed in all sorts of buildings and the nests vary in shape, structure and size just as widely as do those of their Indian subspecies.

In Assam they certainly ascend as high as 4,000 feet, though they are more common at lower elevations. In Burma they are common at 3,000 feet, but not much higher, and they also breed throughout the plains.

In the former province the breeding season is during May and June, a few birds laying in April and equally few in early July. Here I believe they raise only one brood.

In Burma and China they breed from February to August and are said to breed twice or even three times in a year.

They lay two to four eggs, but generally three.

Fifty eggs average 22.7×14.9 mm. : maxima 24.5×14.3 and 24.0×16.1 mm. ; minima 21.0×15.0 and 21.1×14.2 mm.

Cypsiurus batasiensis.

THE PALM-SWIFT.

(1600) **Cypsiurus batasiensis batasiensis** (Gray).

THE BENGAL PALM-SWIFT.

Tachornis batasiensis batasiensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 336.

Cypsiurus batasiensis batasiensis, ibid. vol. viii, p. 681.

This tiny Swift has a range rather similar to that of *Micropus a. nipalensis*, being an Eastern bird of heavy rainfall areas running into the South-West coast, whereas the Western form, paler in colour, is restricted to areas of smaller rainfall. It is found throughout Bengal and Bihar ; Assam, North of the Brahmapootra as far East as the Dibong ; Orissa, Madras and Ceylon. The birds of the Travancore and Malabar coast appear to be also of this race, showing again how the avifauna of this wet South-West corner of India is much closer to that of the North-East of India than it is to that of the far nearer districts of North-West India.

It is a bird of the plains and haunts open country, very confiding and often found in gardens, parks and even the main streets of towns and villages. It makes its nest generally under the leaf of a Palmyra-palm, but occasionally also under the leaves of Coconut, Date, or Betelnut-palms.

The nests are always built under leaves which hang over and so form complete shelters from bad weather. Hume gives a good description of those built under the leaves of the Toddy-palm :—
“ The large fan-shaped leaves of this palm get bent by the wind and hang down so that the points of the leaves turn somewhat inwards ; and it is to the under surface of that portion of the leaf which is bent inwards to which the nest is attached.

“ The bent portions of the leaf stand at an angle of 40 to 70 degrees, so that the under surface becomes in fact the upper surface and presents a sloping furrowed bank in which the nest is attached.

"In one of these furrows formed by the large plaits of the leaf, and always about the centre of this latter, a tiny watch-pocket-shaped nest, composed of fine down of the *Argemone mexicana* and other plants, or in other cases of fine feathers cemented together with the saliva of the bird, is firmly glued. The actual pocket of the nest is rarely above $1\frac{1}{2}$ inch in circumference and $\frac{3}{4}$ of an inch in depth, but the back portion of the nest runs up the plait from 2 to $3\frac{1}{2}$ inches. It is a curious fact that while the rest of the nest is pretty soft the edge of the pocket in front is matted into a sort of cord, just as in the case of the watch-pocket a piping is run round the edge. In one or two nests that I have seen the birds have incorporated the soft petals of the white poppy (so largely grown for opium in Bihar, where this species is specially abundant) with the other materials of the nest."

I have often found the nests made entirely of soft vegetable down and saliva, yet at other times entirely of soft small feathers and saliva. One nest was made of all of these, pure white, except one black feather, far larger than the rest, hanging like a plume from the bottom.

Hume gives the measurement of a nest (*vide supra*) as $1\frac{1}{2}$ inch in circumference. This is probably a mistake for diameter, as a good many nests measured by myself vary from $1\frac{1}{4}$ to $1\frac{5}{8}$ inch in diameter, and none are anything like as small as $\frac{1}{2}$ inch.

The birds breed either singly or, more often, in colonies. Generally five or six pairs breed in the same tree, each pair having a leaf to itself; at other times as many as twenty or more pairs form a colony in a group of trees or even on one tree, and I have seen as many as three nests in one leaf. Inglis found a large colony breeding in some Areca-palms, but in no instance was there more than one nest to a leaf.

They breed practically all the year round and must have two or more broods. In Calcutta I found nests with eggs from November to March and again in July and August; Inglis took eggs in March, April, July and other months as well, and records his earliest eggs as the 25th February and his latest as the 2nd August. Hume received eggs in April and June.

In Ceylon Legge gives the breeding season as October to April and I have received eggs from Phillips taken in December. Davidson says that they breed in Mysore in Betelnut- and Cocoanut-palms in January and February.

The normal clutch of eggs is two, but three are not very uncommon.

They are typical tiny Swifts' eggs. Fifty average 18.2×11.5 mm. : maxima 19.1×11.5 and 18.3×12.1 mm. ; minima 16.6×10.3 mm.

Both sexes incubate and both assist in the building of the nest, but I think the male only brings material, all of which he catches floating in the air.

(1601) *Cypsiurus batasiensis palmarum* (Gray).

THE WESTERN PALM-SWIFT.

Tachornis batasiensis palmarum, Fauna B. I., Birds, 2nd ed. vol. iv, p. 338.
Cypsiurus batasiensis palmarum, ibid. vol. viii, p. 681.

The Western race of Palm-Swift is found over the whole of North-West India as far East as Chota Nagpore and Lohadaga in Western Bengal and to West Bihar. South it is found as far as Belgaum in the Bombay Presidency and the Northern Deccan.

There is nothing one can add about the nidification of this race that has not already been said about the preceding one.

It breeds during a great part of the year. Thompson obtained eggs in the Mirzapar district in March; Theobald in Monghyr in June and July; Bingham at Allahabad in March, April and May and again in July and August; while Betham found them breeding at Baroda in July.

The full clutch is two or three eggs, and I have never seen more, though Adam informed Hume that he had found five eggs in a nest.

The eggs are quite indistinguishable from those of the other races, but I have measured too few to make the measurements of any value. Some taken by Betham average 17.5×11.3 mm.

(1602) *Cypsiurus batasiensis infumatus* (Sclater).

THE EASTERN PALM-SWIFT.

Tachornis batasiensis infumatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 338.
Cypsiurus batasiensis infumatus, ibid. vol. viii, p. 681.

The Eastern Palm-Swift is found in Assam South of the Brahmaputra and East of the Dihong; thence it extends through Manipur and the Lushai Hills over the whole of Burma, the Malay States, Sumatra, Borneo and Java, while East it occurs in Yunnan, Siam and Hainan.

Over the greater part of Burma and in the plains of Assam many of these little Swifts breed in palm-trees in exactly the same manner as do the two preceding races. In the hills always and in the plains occasionally they also breed in the roofs of the native houses or in Tea-garden bungalows etc.

Jerdon recorded that "they attach their nests to the palm-leaves used by the people to roof their houses. The roofs consist of two separate layers of leaves, and it is to the upper surface of the lower layer that the nests are attached."

Godwin-Austen also speaks of their breeding in the roofs of the Naga houses on palm-leaves.

I was very many years in the Naga country, and never saw a roof made of palm-leaves, but doubtless if palm-leaves were used the birds would have built their nests on them. All the houses I have seen, unless temporary structures, were thatched with long grass or, failing this, with bamboo-leaves. The little birds placed their

nests in tunnels in the thick thatch, resting on the lower surface of the tunnel and completely protected above. Exceptionally the nests were attached to the ends of loose bunches of grass round the edge of the thatch. The nests were made of feathers and down, or one or the other cemented together with inspissated saliva, exactly like the nests built on palm-leaves, but generally more shallow. Some were built quite close to the entrance of the tunnel, a few as much as 2 feet inside. In the plains they build both in the thatch of houses and in palms, and I have seen a colony of about forty pairs nesting in the roof of a bungalow and in some palms which grew almost touching the thatch.

In the villages in the hills one or two pairs only as a rule occupy each house, but some seem more especially favoured than others and may be occupied by a dozen or more pairs. The little birds are very tame and confiding, passing backwards and forwards within a few feet of the occupiers, often entering the houses after insects.

They are found at least as high as 6,000 feet in the Assam hills, possibly a great deal higher, but in Burma are not, apparently, common above 3,000 feet.

The breeding season is from March to August in the plains, and probably most birds have two broods. In the hills April, May and June are the breeding months, and I do not think many birds lay twice.

The full clutch of eggs is two, more rarely three.

Fifty eggs average 17.1×11.7 mm.; maxima 18.1×12.1 and 17.6×12.2 mm.; minima 16.2×11.2 and 16.8×10.9 mm.

Both sexes incubate and both take a share in the work of nest-building.

At night both parents sleep in the nest, when in a tunnel in a roof, and the young birds return to it with them for several nights after they have learned to fly.

Subfamily CHÆTURINÆ.

(SPINE-TAILED SWIFTS and EDIBLE-NEST SWIFTLETS.)

Hirundapus caudacutus (Lath.).

THE WHITE-THROATED SPINETAIL.

(1603) *Hirundapus caudacutus nudipes* (Hodgs.).

THE INDIAN WHITE-THROATED SPINETAIL.

Hirundapus caudacutus nudipes, Fauna B. I., Birds, 2nd ed. vol. iv, p. 340.

This grand bird is found over the Outer and Lower Himalayas from Hazara to Eastern Assam, where it may be found hawking for insects over wide stretches of well-wooded open country, especially such as are broken up with steep cliff-precipices.

Nothing is recorded as to its nidification, but I have an oviduct egg taken from a female shot in North Cachar on the 14th April, 1899. At that time nothing was known about the nidification of any of the Spinetails but, judging from what has since been discovered by Bell and Stewart, it is very possible that birds of this species were nesting in the innumerable great hollow Oaks which covered the park-like country for miles around.

The egg is, of course, pure white and much the same in texture and shape as the egg of a Barbet. Possibly, however, the shell was not perfect, and may have become much more heavy before deposition.

It measures 31.2×22.4 mm.

(1604) *Hirundapus caudacutus cochinchinensis* (Oust.).

THE COCHIN CHINA SPINETAIL.

Hirundapus caudacutus cochinchinensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 342.

This race of Spinetail occurs from Assam South of the Brahmapootra through Burma and the Malay States, South to Sumatra and East to Cochin China.

It is extremely common in the Assam hills below 4,000 feet, and I obtained one oviduct egg from a female shot on the 26th May.

I described the breeding of this bird in 1896 (Journ. Bomb. Nat. Hist. Soc. vol. x, p. 547) but, beyond this, nothing is known about it. In the North Cachar Hills, during their occupation by the Khasias, limestone was worked in the North of the district in the superficial lime which there covers a vast area. Trenches, sometimes over 20 feet deep, were dug parallel with one another and, between these, communicating passages were cut underground. In course of time the sides of the trenches have much crumbled and have become overgrown with trees and other cover, but the connecting passages have remained clear, owing to their being closed overhead. These passages, or caves, were, and doubtless still are, a favourite haunt of bears, and one day, while tracking one of these, I noticed the Spinetails flying in and out of the caves. A search revealed what looked like a nest up on the roof of a cave and, though this was inaccessible, we found two others which, with a little trouble, we were able to reach. They were empty, but a third nest in another cave held three young birds of the present species, while old birds were flying about the cave. Besides this nest there were two or three others, all empty. The nests were fastened to the sides of the caves, nearly all rather high up, but those we could get at and pull down were all alike, heavy, strongly made half-cups, composed almost entirely of dried moss which the bears had collected for beds, and with numerous long hairs of the bears mixed with it. The whole had been matted together with the birds' saliva and a great deal

of mud or earth. The nests were very massive, measuring about 6 inches in their long diameter, some a little more, others a little less; the breadth was about $3\frac{1}{4}$ inches and the depth $2\frac{1}{2}$ to $2\frac{3}{4}$ inches. The interior measurements were $1\frac{1}{2}$ inch less every way. There was no lining, but a few pieces of moss lay here and there stuck to the saliva which formed the greater part of the bottom of the nest. A fragment of egg picked up, which measured about $\cdot 61$ inch (≈ 15.9 mm.) in diameter, was possibly of this bird, but seems too small, and now that we know so much more about the breeding and the nesting of the Brown-throated Spinetail, I am inclined to think that the nests I found were those of *Micropus subfurcatus* and the egg also one of that bird, the Spinetails having taken possession of old nests of the smaller Swifts. These latter birds were common in the vicinity.

As the young Swifts found on the 28th April were ready to fly, while the oviduct egg was extracted on the 26th of May, it would appear that the breeding season may last from February to June.

The oviduct egg measures 28.1×21.0 mm.

I think it is probable that the above instance of the Spinetails breeding in a cave may be exceptional, as I never got others, though we worked very hard for them. The whole of this country for miles upon miles was open park-land dotted over with great black Oaks, a very large percentage of which were hollow, so it seems most probable that such trees formed the normal breeding places for the Spinetails.

***Hirundapus giganteus* (Temm.).**

THE BROWN-THROATED SPINETAIL.

(1605) ***Hirundapus giganteus indicus* (Hume).**

THE INDIAN BROWN-THROATED SPINETAIL.

Hirundapus giganteus indicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 343.

This magnificent Swift is found all over Burma, South-West Siam, Assam, Manipur and the Andamans. It is also found and is resident in Ceylon and in South India about as far North as latitude 12° .

The first person to take the nest of this Spinetail was J. Stewart, and the following is a summary of the information he has given me from time to time:—

“This Swift breeds over an enormous stretch of country in the Travancore and Malabar coast districts, principally between 500 and 1,500 feet and in forests where the heat is very great, a damp humid heat up to 100° in the shade. For the most part the birds keep to forests of great deciduous trees without very dense undergrowth, but they do sometimes breed in very thick evergreen forest

if there are suitable trees. Although the birds roost in hollow trees in quite big flocks, only one, rarely two, or at the outside three, pairs will breed in the same tree. They select for this purpose enormous trees which are more or less hollow from top to bottom, and they prefer those to which they can obtain access by a hole, however small, at a great height from the ground. They very often breed in the tree *Valeria indica*, which is common in the deciduous forests, grows to a great height and is often hollow for its whole length. The birds make no nest, but simply scratch out a hollow in the accumulated mass of dust and rubbish at the bottom of the hole and, more than once, I have found these saucer-shaped hollows made a foot or 18 inches below the level of the surrounding land. The hunting out of these nests with the help of the local tribesmen is most interesting but very arduous work, the area to work is so vast, the number of possible trees so great, that for every success one must expect a hundred disappointments. Perhaps one may have the luck to see a Swift appear and dart with lightning speed into some almost invisible hole far overhead. A few strokes of an axe effect an entrance into the bottom of the tree, and the nose of the axeman then without fail is able to detect the presence or absence of the desired nest. An occupied or even an empty nest has a smell which, to a native, is unmistakable and which is quite different to that of a roosting-tree or one occupied by bats, and the men seldom if ever made a mistake. My first nests were found on the 2nd March, 1912, exactly as described above, but unfortunately they were empty. The holes were carefully closed, and on a subsequent visit were opened and we could see eggs in the nests. The birds dashed up the hollow tree to the exits high up in their tops, but one, in her fright and agitation, struck something and came floundering down and was captured. In this tree there were two nests each with two eggs only, but they generally lay three, sometimes four, and I have occasionally found five eggs or young in a nest. The eggs seem to become filthy in a very short time, and I have seen some in a complete but fresh clutch so densely coated with dirt, principally the birds' own droppings, that it took hours of work with a hard nail-brush and soap to get them clean. Soaking effects but little, as the droppings seem almost impervious to water. Trees which may hold only one or two nests are often occupied above by many birds for roosting purposes and, of course, they add their quota to the droppings accumulated below. Occasionally a tree which has been the nesting place of a Woodpecker or Barbet, but which has become too completely hollow inside for these birds to nest in, is taken possession of by a pair of Swifts, and the manner in which these birds, the fastest fliers in the world, hurl themselves through the tiny opening has to be seen before it can be appreciated.

“ The breeding season is almost confined to March and April,

though one year they may possibly have bred in October. They are not double brooded."

The eggs are *sui generis*. They are pure white when just laid, but soon become so filthy that it is almost impossible to remove all stains. In shape they are broad ovals, in some cases almost elliptical. The texture is fine, close and hard, with a shell so strong and tough that it is more reptilian than avian in character and unlike that of any other bird's egg known to me.

One hundred eggs average 30.7×22.2 mm.; maxima 32.1×22.5 and 31.2×23.5 mm.; minima 28.8×22.0 and 29.9×20.0 mm.

(1606) *Indicapus sylvaticus* (Tickell).

THE WHITE-RUMPED SPINETAIL.

Indicapus sylvaticus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 344.

This little Spinetail is found in the forest country of Cachar and Sylhet, Bengal South to the Godavery and West to the Wyne Gunga; Seoni in the Central Provinces, Garhwal and Sikkim in the Himalayas; South-West India from the Mysore hills to South Travancore.

It is found in the plains and up to some 2,000 feet in the hills, occasionally ascending to 3,000 in Travancore where there are thin deciduous forests.

Bell was the first collector to find the nests and eggs of these birds in 1910, and described them in a letter to Davidson as follows:—
"They breed in small colonies in groups of cocoanut-palms in the evergreens, two or three nests being sometimes found in a single tree. The nests are like those of the edible Swiftlet, placed up against the sides of the hollow stems, inside and always near the bottom of the hollow, certainly not more than a foot or a foot and a half above it. They are rather shallow half-cups composed of small lengths of dry or dead twigs broken off the top of thin twigs in the jungle and stuck together with absolutely transparent saliva, so that the nest looks as if built up of these pieces with nothing to hold them together. There is no lining, not even a scrap of palm-fibre from the inside of the tree."

The nests were often difficult to get at on account of the extreme rottenness of the trees, which were too brittle to climb, several nests being lost by Bell and Davidson through the trees falling and smashing the eggs.

In Travancore Stewart found these small Swifts breeding in the same country and nesting in the same kind of trees as those frequented by the large Spinetail. Here, however, the nests were easier to get at, in that the trees were strong enough to bear a heavy weight, but often the nests were built high up inside the trees, and the climber had to be as active as a cat to get at them. One nest

found by Stewart was 40 feet from the ground, another over 30, while few were below some 15 to 20 feet. As a rule only one new nest was found in each tree, but occasionally two were found with eggs, and once three nests were obtained in the same hollow. Nearly always nests of the preceding year were seen quite close to the old one, and Stewart speaks of "several" old nests being seen near one new one taken by him; so the birds evidently return year after year to the same site.

No better description of the nest can be given than that of Bell's recorded above, though I can see no resemblance to the nests of *Collocalia*. One sent me by Stewart measures $2\frac{3}{4}$ inches in its longest diameter and only $1\frac{1}{2}$ across the shorter. As mentioned by Bell, the saliva is invisible, and it seems impossible for the chips of twig to hold together. Most of the twigs vary in length from half an inch to an inch, but two bits in one nest exceed $1\frac{1}{2}$ inch in length. The breeding season is March and April, but Stewart obtained a few eggs in the first half of May.

The eggs vary from three to five in number and resemble exactly the eggs of *Collocalia*, being pure white, fine but not very close in texture, fragile and without gloss. They have no trace of the thick shell so typical of the eggs of *Hirundapus*. In shape they are long blunt ovals.

Sixty eggs average 17.5×12.1 mm.: maxima 20.8×13.1 and 20.1×13.2 mm.; minima 16.0×12.2 and 16.9×11.5 mm. Few eggs vary so greatly in proportion to their size as do those of this little Swift.

Collocalia unicolor.

THE EDIBLE-NEST SWIFTLET.

(1608) *Collocalia unicolor unicolor* (Jerdon).

THE INDIAN EDIBLE-NEST SWIFTLET.

Collocalia unicolor unicolor, Fauna B. I., Birds, 2nd ed. vol. iv, p. 346.

This Swiftlet occurs over the greater part of Southern India wherever there are suitable places for breeding in. Great numbers breed in various islands off the coast and others breed in the Nilgiris, Palni and other hills of Mysore and in the Travancore hills also up to some 4,000 feet but generally under 2,500 feet. In Ceylon it is even more common, here also breeding at all levels from the small coastal rocks and islands to above 4,000 feet in the hills.

There are numerous accounts of its breeding in Hume's 'Nests and Eggs.' Davison and Cardew describe its breeding in the Nilgiris, Jerdon in Pigeon Island, Vidal on the Vingorla and Malvan Rocks, Terry in the Palni Hills and Bourdillon in Travancore. In Ceylon its breeding is described at length by Legge.

All these accounts agree with one another and also with those given by Campbell, Packard, Williams, Wait and all the later writers.

The birds always breed in colonies, though these vary greatly in size. Sometimes no more than a dozen or twenty pairs may occupy a cave, while at other times they may be very much more numerous. Bourdillon counted 250 nests in a cave in Travancore, while Legge says that about 300 pairs bred in one of the best-known caves at Hapatale in Ceylon. They make their nests in caves of any size, some very small, others very large, while they often also nest in railway-tunnels and similar places. Williams found a colony breeding under the Wenlock Bridge on the Wellington-Coonor road in April 1926. Always, however, the nests are placed in the darkest recesses of the cave or tunnel, where hardly any light or no light at all reaches the nests. These are built up against the roof and higher parts of the sides of the cave and very seldom within easy reach of the hand. If the cave is big and the colony small the nests may be scattered about it singly but, more often, they are built in clusters, half a dozen to a score or more of nests all touching one another at the sides, while those above and below them are but an inch or two apart. Vidal gives a very good account of the nests, and says:—"None of the nests I have got from the Vingorla Rocks are pure white. The nests are all mixed with grass and feathers, the saliva being pure only where the nest is attached to the rock and on the rim of the saucer. The nests vary a good deal in size and shape. They are very shallow, seldom deeper than half an inch, and have a diameter of about 2 inches. Externally the saliva, freely mixed with grass and feathers, is smooth and coagulated. Inside the cup it forms a network of fine shreds. They look at a little distance exactly like deep oyster-shells with one side flattened, the saliva where it is smoothed down having a pearly appearance." In order to obtain pure white nests Vidal again and again sent men to the breeding places or went himself with the men who farmed the nests, but all were the same, grass and feathers mixed to some extent with saliva.

I have had one or two nests sent me which were more than half saliva, but ninety-nine out of a hundred, whether first nests or not, are as described by Vidal, though the material may differ a little in different nests. Both Davison and Cardew say that in the Nilgiris the bulk of the material used is a grey thread-like lichen.

The birds stand a great deal of bullying before they will desert their breeding caves. The nests are farmed out for exportation to China and the Indo-Chinese countries, the farmers collecting all the first nests and often the second lot as well, while the third lot is left, and the birds then lay and bring up their young in peace. The weight of the nests so collected may be anything from 5 to

50 pounds, though the weight of the saliva when the nests have been boiled down is nothing like half this amount.

The breeding season is generally April, May and June, but Jerdon visited Sacrifice Rock in March when a few of the nests had eggs in them, and Jerdon says that the first lot of eggs had already been taken.

The full clutch of eggs is always two; Bourdillon writes of one egg only being laid, but as these were nearly all fresh, two only being incubated, most may have been incomplete clutches and the others second layings, as the farmer had already taken one batch of nests from the colony. They are typical little Swifts' eggs, white, fragile and glossless, long blunt ovals in shape.

Eighty eggs average 20.9×13.5 mm.; maxima 22.2×13.4 and 21.0×14.1 mm.; minima 19.7×13.1 and 20.8×12.6 mm.

Legge has an interesting note on some young birds, and says "the partially fledged young which were procured for me on this occasion and which I kept for the night scrambled out to the exterior of the nests and slept in an upright position. This is evidently the normal mode of roosting of this species."

It is, we may add, the normal method of roosting with most Swifts.

***Collocalia fuciphaga* (Thunberg).**

THE PLAIN-RUMPED SWIFTLET.

(1609) *Collocalia fuciphaga brevirostris* McClell.

THE HIMALAYAN PLAIN-RUMPED SWIFTLET.

Collocalia fuciphaga brevirostris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 348.

The distribution of this Swiftlet extends all through the Himalayas from Naini Tal and Dalhousie to Eastern and Southern Assam. Forrest obtained it in the Mekong-Salwin divide and Livesey found it very common in parts of the Shan States. It is entirely a mountain bird, but descends to 2,000 feet, while, on the other hand, it has been recorded at 12,000 feet in Sikkim by Blanford and Stevens.

This little Swift bred in several places in North Cachar, but in such appalling cliff-faces that I never got at more than two. Of these one was a small cave in a very steep cliff-face and within some 30 yards or so of the nest of a Cinereous Vulture. The caves—there were two of them—were but little more than crevices in the face of the rock a few feet wide and extending back about 10 or 15 feet. The nests were all near the apex of the crevice where the walls met above and where we found about a dozen nests. Three nests had each two eggs and the rest had young on the 18th April. Another colony was found breeding in a cave formed by the enormous

buttresses of a Cotton-tree which had fallen over a cliff; in this there were about twenty pairs breeding on the 5th April, one nest having two eggs. Both these places had evidently been used for many years; fragments of nests on the ground and portions of others still sticking to the walls showed this, while the ground was thick with droppings, especially in the caves in the rock. The nests were small half-saucers, attached to the rock or tree buttresses made of inspissated saliva and feathers, measuring about $1\frac{1}{2}$ inch. each way and not more than $\frac{1}{2}$ to $\frac{3}{4}$ inch deep. The birds seem to have selected nearly all black feathers, mixed with which were a few tiny bits of grass. Round the edges and next to the wall there is a rim of almost pure saliva, but elsewhere the saliva hardly shows at all.

In the Shan Hills Livesey found these birds breeding in great numbers in deep fissures in the ground, generally in the dip between the hill-tops at about 4,000 feet. These crevices were said by the Shans to be almost bottomless, and the Swiftlets could be seen flying in and out of their depths in a constant stream. Two eggs given to me are exactly like those found by myself in North Cachar and were taken on the 23rd of April.

Eight eggs average 21.8×14.6 mm.; maxima 22.2×14.3 and 21.4×15.2 mm.; minima 21.4×15.2 and 22.2×14.0 mm.

According to Livesey the caves or crevices haunted by these Swiftlets in the Shan States are also occupied by vast numbers of bats and a few owls which prey on the latter.

(1610) *Collocalia innominata* Hume.

THE STRIPE-BUMPED SWIFTLET.

Collocalia innominata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 340.

This Swiftlet is found over the Andamans, South Tenasserim and South-West Siam and Selangor.

Hopward (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 859, 1919) thus describes the nidification of this bird:—"These two species" (*C. innominata* and *C. francica*) "breed in company in large numbers on the Mali islands, a few miles from the coast, about halfway between Tavoy and Mergui. *C. francica* makes the edible nests of commerce, but the nests of *C. innominata*, though of very little value on account of the large amount of grass and feathers used in their construction, are also collected by the licencees.

"*C. innominata* is the earlier breeder of the two, commencing nesting operations in February, a few eggs being laid about the first week in March, but *francica* does not lay until well on in April. *C. innominata* plasters its nests at random on the walls of the cave anywhere above high-water mark. *C. francica* always goes to the

top of the cave. The eggs of *C. innominata* are larger and the eggs of the two species can be distinguished with certainty."

Hopwood gives the average size of *innominata* eggs as $\cdot 94 \times \cdot 62$ inch (=about $23\cdot 9 \times 15\cdot 7$ mm.).

Writing of the birds breeding in the above caves he remarks: "The numbers are so great as to recall white ants fluttering round a lamp, and the birds may even be caught by a quick grab of the hand, a feat which we saw actually performed several times."

Collocalia francica (Gmelin).

THE GREY-RUMPED SWIFTLET.

(1612) *Collocalia francica inexpectata* Hume.

THE ANDAMAN GREY-RUMPED SWIFTLET.

Collocalia francica inexpectata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 350.

This form of Grey-rumped Swiftlet is a resident in the South Andamans, Nicobars, Pulo Tioman and islands and coasts of Southern Malay. It has also occurred once in Tenasserim but does not breed there.

Osmaston found this bird breeding round the coasts of the Andaman Islands in March and early April in small caves on the rocky shores. The birds were apparently breeding in small colonies of about 25 to 100 pairs, fixing their nests to the roofs and upper sides of the caves. The nests he describes as being made of "pure white semi-translucent inspissated saliva, a half cup, stuck up against the sloping roof." The cave he describes as small, the floor being just above high-water level and the roof about 10 feet from the ground. In length it was about 12 feet and half that in width, yet it held about 100 nests. Two of the latter, sent to me from the South Cinque Islands, taken by Osmaston, are made of innumerable threads of saliva criss-crossed in every direction, and forming a bottom of about $\frac{1}{16}$ to $\frac{1}{8}$ inch thick, the walls a little thicker with a strong rim round the edge. Where also the nest is attached to the wall the base and edges are a trifle stouter. In both the nests sent to me there are tiny bits of moss and a few small feathers incorporated, but the greater proportion of the nest is saliva only. One nest is a deep half-cup measuring just under $2\frac{1}{2}$ inches where it was affixed to the roof and about $1\frac{1}{2}$ across the half-cup, while it is over an inch deep. The other is just over $2\frac{1}{2}$ inches across the longer diameter, but is a very shallow half-saucer, not $\frac{1}{4}$ inch deep.

The eggs are, of course, two in number as usual, forty-eight averaging $20\cdot 2 \times 13\cdot 6$ mm.; maxima $21\cdot 3 \times 13\cdot 5$ and $20\cdot 9 \times 14\cdot 0$ mm.; minima $18\cdot 5 \times 13\cdot 1$ and $19\cdot 7 \times 13\cdot 0$ mm.

(1613) *Collocalia francica germaini* Oust.

THE MALAY GREY-RUMPED SWIFTLET.

Collocalia francica germaini, Fauna B. I., Birds, 2nd ed. vol. iv, p. 351.

This Swiftlet has a wide range, being found from the islands off Mergui, North Malay Peninsula and South-West Siam to Cochin China and the Philippines. It was first found on Condore Island.

So far as I know the nests and eggs of this bird have only been taken by J. P. Cook, Hopwood and Mackenzie, who found them breeding in caves in cliffs, the one in an island off Mergui in April and the other near Tavoy on the 15th May.

The only nests I have seen of this race, perhaps second nests, are very bulky, being composed almost entirely of small black feathers and scraps of straw all massed together with saliva. Just next to the rocks to which they were attached the saliva shows fairly pure and white, elsewhere it shows in the usual strings, but black and dirty. They are the usual half-cups or saucers in shape, one measuring $3\frac{1}{2}$ inch longest diameter, $1\frac{1}{4}$ across the shorter and about 1 inch in depth. The colonies seen by Cook and Mackenzie were both small.

I have only four eggs, which average 20.4×14.05 mm. Two eggs are short broad ovals, 19.0×14.2 and 19.3×14.0 mm.; the other two long ovals, 21.0×14.0 and 22.1×14.0 mm.

Collocalia linchi Horsf. & Moore.

THE SMALL SWIFTLET.

(1614) *Collocalia linchi affinis* Beavan.

THE ANDAMAN SMALL SWIFTLET.

Collocalia linchi affinis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 352.

This small Swiftlet is confined to the Andamans and Nicobars, where it breeds in vast numbers.

Hume records of this Swiftlet that normally it breeds in caves, quoting Tytler to the effect that in two years in the Andamans he never saw a nest in a building, and he then goes on: "But since Colonel Tytler left the Andamans a change has come, and at the settlement of Port Blair they breed freely inside houses, both on Ross and Chatham Islands, the interior of the saw-mills being their most favourite haunt. There is another shed at Viper also in which they breed.

"There has been some grave error in regard to the nests of this Swiftlet; it does *not* make any of the edible nests. There is no

mistake about this : I have shot the birds and taken the nests out of caves, and Davison has done the same out of buildings, and the nests are in all cases similar, somewhat shallow, flat-bottomed, half- or two-thirds saucers, composed of brown moss, firmly agglutinated with saliva ; only along the line of junction with the place of attachment is there a thickish film of unmixed inspissated saliva, and that is brownish and not white.

" The white nests are made by *C. spodipygia* and probably also by *C. innominata*."

Half a century later Osmaston completely endorses this ; he writes (Journ. Bomb. Nat. Hist. Soc. vol. xvii. p. 486, 1906) :—" It breeds in vast numbers in the saw-mills at Chatham, as well as in various caves along the sea-shore, e. g., at Chirugu Tapu. The nests are composed of moss consolidated with small quantities of saliva. In the Chatham saw-mills, however, moss is not used, but casuarina leaves and sometimes coconut-fibre instead. Neither the casuarina-tree nor the coconut-palm is indigenous in the Andamans. The nests of this species are of no commercial value. The average weight of a nest is $\frac{1}{2}$ oz."

The bird's method of constructing the nest is thus described by Davison :—" They bring a tiny piece of moss and cling on to the roof ; then for four or five minutes you see the little bird's head going backwards and forwards, and then off he flies, and you see that the piece of moss has been stuck on. They do not seem able to stick the moss on to white paint. One pair tried for nearly a week : at last they gave it up as a bad job."

Capt. Wimberly, however, did at last get a nest which " was built on to the white-painted ceiling of my house. The little birds had been trying to get a footing there for two years."

As regards the size of the nest Hume says they " vary in size, but they average about $2\frac{1}{2}$ inches across, stand out from $1\frac{1}{2}$ to $1\frac{3}{4}$ inch from the rock or wall, and are about an inch deep. They vary from $\frac{1}{2}$ to more than $\frac{1}{2}$ inch in thickness."

Osmaston obtained eggs from the 25th December to the 4th April, but most birds breed in February and March.

One hundred eggs average 17.5×11.2 mm. : maxima 18.7×11.2 and 17.2×12.0 mm. ; minima 17.0×11.0 and 18.0×10.2 mm.

In the ' Fauna ' I mention two nests, sent to me as the nests of this bird, which are made entirely of pure inspissated saliva. I am inclined to think from what Mr. Osmaston tells me that these are the nests of *C. f. inexpectata*, which breeds also in the caves on the coasts of the Andamans.

Subfamily HEMIPROCINÆ.

(CRESTED SWIFTS.)

(1616) *Hemiprocne coronata* Tickell.

THE INDIAN CRESTED SWIFT.

Hemiprocne coronata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 354.

This beautiful Swift is found in Ceylon and practically the whole of India omitting Sind, the drier portions of Rajputana, the Deccan, Carnatic and parts of Central India. It occurs throughout the Lower Himalayas from Dehra Dun to Eastern Assam and in suitable places through the whole of Burma East to the Southern Shan States and Siam.

This is a Swift of well-wooded country and forests where there is an ample rainfall, ascending hills up to about 4,000 feet and found throughout the plains. Osmaston notes (Journ. Bomb. Nat. Hist. Soc. vol. xxvii, p. 283, 1931):—"They frequent open forest, and especially glades in the forest near water. They are resident and non-migratory so far as my experience goes." This is quite correct; at the same time the birds indulge in curious movements. For some years they were common in the North Cachar Hills, though restricted entirely to certain open country surrounded by forest. Eventually for some reason every bird left these hills, and I practically never saw them again. I have been told of similar cases of their sudden appearances and disappearances in Burma.

Davidson obtained many eggs in Kanara; Phillips and Wait almost as many in Ceylon; Thompson obtained two or more in the Central Provinces, where also Osmaston found a nest; and Terry secured a nest and egg in the Palni Hills.

The nest is a tiny cup varying considerably in size and shape, which is attached to the side of a bare branch of a tree often at a great height from the ground, but more often at about 25 feet up. Often, however, it is built on rotten or semi-rotten branches in very inaccessible positions, so that the egg is nearly always hard to get at. The nest itself is a tiny cup, half-cup or saucer, sometimes more of an inverted cone than a cup, composed of small thin scraps of bark and soft little feathers stuck together with saliva. One nest before me measures under $1\frac{1}{2}$ inch lengthways, $\frac{3}{4}$ of an inch across and exactly half an inch deep. The walls of this nest are flush with the top of the branch to which it is fixed, and the tops of the walls extend on to the top of the branch, increasing its breadth at this part to $1\frac{1}{8}$ inch. The branch itself is about 1 inch thick. Another nest is an inverted cone, $1\frac{1}{4}$ by $1\frac{1}{8}$ inch in diameter and just over $\frac{3}{4}$ inch deep. The walls are no thicker than stout writing-paper, increasing gradually towards the bottom to about $\frac{1}{16}$ of an inch,

or, in the cone-shaped nest, to about $\frac{1}{8}$ inch. The nests in fact are just big enough to hold one egg, and from below all one sees is a Swift sitting on a small projecting knob of a branch, and often even this is hard to make out. It seems quite impossible for the egg to remain safe in the nest until it is hatched, and it would certainly not do so if it were left for many minutes unguarded, as the first high breeze would send it crashing to earth. The birds sit very close and relieve one another most carefully, the sitting bird sidling sideways off the nest as the relieving bird sidles on, touching his mate all the time. Occasionally the nest is built against a stout branch some inches in diameter; sometimes it is attached to one which is little more than a twig; always, however, I think the top is flush with the upper surface of the branch on which the bird really sits, only its vent and posterior abdomen covering the egg.

In Kanara, where this bird is very common, Davidson took nearly all his eggs in March and a few in April, but Thompson obtained eggs in the Central Provinces up to the 7th May, while Terry took a single egg in the Palni Hills on the 7th April. In Ceylon they also breed principally in March, but Wait has taken eggs from March to August and Phillips one as early as the 12th February.

The eggs are not white, as described by Hume, but a pale grey tinged with blue when fresh, though this quickly fades. The texture is fine, not close, and quite glossless, being silky to the touch. In shape they are practically true ellipses, one end scarcely showing smaller than the other.

Twenty-nine eggs average 23.7×17.1 mm.: maxima 25.0×18.0 mm.; minima 22.3×16.7 mm.

Both sexes incubate, though there is nothing on record as to which sex makes the nest or how long incubation lasts; Osmaston, however, has the following interesting note (*in loc. cit. supra*):—“The birds were observed commencing this nest on March 19th; on March 26th the nest was apparently completed but the egg was not laid until April 11th. The nest was attached to a dry branch about 40 feet from the ground.”

Hemiprogne longipennis Rafinesque.

THE JAVAN CRESTED SWIFT.

(1617) **Hemiprogne longipennis harterti** Stresemann.

THE MALAYAN CRESTED SWIFT.

Hemiprogne longipennis harterti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 356.

This race of the Javan Crested Swift ranges from South Tenasserim and South-West Siam, through the Malay States to Sumatra and Borneo.

Mr. J. Houwing has taken fine series of the eggs of the typical form in Java, the nidification of which is exactly like that of the Indian bird but the eggs are much more blue-grey. I have seen only one nest and egg of the Malayan race. The nest is quite typical, made of tiny flakes of bark and saliva, attached to a small branch of a tree 25 feet from the ground. It measures $1\frac{1}{2}$ by 1 inch diameter by under $\frac{1}{2}$ inch deep. It was taken by Major Moulton near Sarawak on the 25th February.

The egg is grey, like that of the Indian bird, the same also in shape and texture, and it measures 23.2×17.2 mm.

Hemiproene comata.

THE TUFTED TREE-SWIFT.

(1618) **Hemiproene comata comata** Temm.

THE MALAY TUFTED TREE-SWIFT.

Hemiproene comata comata, Fauna B. I., Birds, 2nd ed. vol. iv. p. 357.

The Tufted Tree-Swift extends from the extreme South of Tenasserim, through the Malay Peninsula, to Sumatra, Borneo, Java, the Natunas, Sibutu and the Sulu Islands.

Although a forest bird, like other Tree-Swifts, this bird prefers glades, river-sides and quite open forest, both in the plains and in the hills up to some 2,500 feet.

Nothing is recorded of its breeding, but Kellow obtained one nest and egg for me near Simpang, in the Federated Malay States. The nest was taken from a thin branch of a tree, about 40 feet up, which stood in country more open and heavily wooded rather than forest.

The nest is a shallow saucer of pure inspissated saliva with just one tiny scrap of moss attached to one side. It is made exactly like the nests of the Edible-nest Swiftlets, innumerable threads of pure hardened saliva criss-crossing one another in all directions and partially melting into one another. It measures $1\frac{1}{2}$ inch at the side attached to the branch and juts out about $1\frac{1}{2}$ inch from it, while in depth it is only $\frac{1}{2}$ inch, the depression in the centre hardly visible. It seems incredible that the nest could have retained the egg in it even when the parents were sitting, and they could certainly have never left it for a moment.

The egg is practically white with only the faintest tinge of grey, and may be abnormal in colour. It measures 25.0×15.0 mm.

Suborder CAPRIMULGI.

(NIGHTJARS.)

Family CAPRIMULGIDÆ.

(NIGHTJARS.)

Caprimulgus europæus Linn.

THE EUROPEAN NIGHTJAR.

(1619) **Caprimulgus europæus unwini** Hume.

THE HIMALAYAN NIGHTJAR.

Caprimulgus europæus unwini, Fauna B. I., Birds, 2nd ed. vol. iv, p. 359.

The Himalayan form of the European Nightjar breeds from Afghanistan, Baluchistan and Persia to Kashmir, Kuman and Garhwal.

It is entirely a hill bird, breeding at 5,000 feet upwards to at least 9,000 feet. In Sind, however, it breeds at much lower elevations. Ludlow obtained it at about 1,000 feet in the Pabb Hills and Eates in the same place at about the same elevation. Waite also found that it breeds in the Salt Range at low elevations. This Nightjar breeds both in scrub-jungle, open forest and on the barest and most stony of hills. In Murree Rattray obtained it breeding freely in comparatively thick jungle; about Thal, near Kohat, it was also very common at about 1,500 feet, breeding in well-wooded nullahs in June and July, but here also its eggs were taken by him on very bare stony ground. These eggs Rattray at first believed to be those of *mahrattensis*, but afterwards he discovered his mistake and ascertained what they really were.

Osmaston took its eggs in Tehri-Garhwal and Chakrata, its Eastern limit, at 7,500 and 6,000 feet respectively, the eggs being deposited under rocks or trees on steep hill-sides covered with thin Oak-forest (*Q. incana*).

Waite says that in the Punjab Salt Range (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, p. 822, 1926) this Nightjar nearly always lays its eggs "under the shelter of a bush, often one of fair size," and that it may sometimes be found on the steep and rocky sides of a ravine. The "foot" of a Santha-bush is a site often selected. In one such case a bird was flushed from an egg lying on a flat stone underneath the bush. The ground all round was littered with dry Santha-leaves, and the bird had apparently cleared the stone of them before laying her egg on it.

This Nightjar is a very late breeder even in its hottest haunts. Occasionally it lays in the second half of May, but most eggs are laid in June and many in July. It is not double-brooded.

The number of eggs laid is of course two, as with all other species of the genus.

They are exactly like those of the European bird except for being slightly smaller. The ground is white, very rarely faintly tinged with pink. Some eggs are spotted with black, the marks of fair size and scattered about the surface unequally over the whole egg; underlying these are secondary blotches, scrawls and smears of pale lavender-grey. At the other extreme eggs may be obtained sparsely marked with grey and with no primary black spots at all. Others are marked with primary blotches and smears of light brown or rich vandyke-brown with secondary blotches as in the first type. Other eggs, again, are marbled all over with brown or with grey, while a few have added streaks or large smears of any one of the colours already mentioned.

In shape again they are similar to all other eggs of *Caprimulgi*, rather broad ellipses. The texture is fine and close and the surface glossed, often highly so.

Forty-four eggs average 29.9×21.2 mm.; maxima 33.1×23.2 and 31.9×23.7 mm.; minima 27.6×21.1 and 29.5×20.0 mm.

Caprimulgus macrourus Horsf.

THE LONG-TAILED NIGHTJAR.

(1620) **Caprimulgus macrourus atripennis** Jerdon.

THE SOUTHERN LONG-TAILED NIGHTJAR.

Caprimulgus macrourus atripennis, Fauna B. I., Birds, 2nd ed. vol. iv., p. 361.

This Nightjar, formerly called Jerdon's Nightjar, is found in Ceylon and the whole of Southern India in suitable country about as far North as Kanara in the Bombay Presidency on the West and the Godavery Valley on the East.

This is apparently more of a jungle bird than the Common Indian Nightjar, though it prefers open forest without much undergrowth. It also often frequents bamboo and scrub-jungle, even round villages, and occurs throughout the plains and in the hills up to some 4,000 feet or in Ceylon, according to Wait, up to 3,500 feet.

The only note in Hume's 'Nest and Eggs' is that of Legge, who says that it breeds in the West of Ceylon during the latter part of the dry season in April and May. Davidson took numerous eggs in Kanara in March and early April; Kinloch obtained a pair in the Nelliampathy Hills in February and I have a pair of eggs taken in Khandesh in July.

Although superficially it seems impossible to separate this bird from the *macrourus* group, its eggs, just as well as its voice, habits etc., are quite unlike any other *macrourus* eggs. The ground varies from a very pale cream to a rather dark dull buff, while the marks consist of blackish-brown spots scattered irregularly over the whole surface; occasionally the spots are more reddish-brown but, whatever they are, they stand up boldly and clean-cut against the ground. Some eggs have a few specks also scattered about of the same colour as the spots, though these are unusual, but there are no secondary markings, no lines and no marblings. In one egg only I have seen two smudgy blotches of pale sepia with a darker outline.

In shape they are rather broader ellipses than is usual with Nightjar's eggs.

Twenty-five eggs average 30.1×22.2 mm.: maxima 31.3×23.5 mm.; minima 29.0×22.0 and 31.1×21.1 mm.

(1621) *Caprimulgus macrourus bimaculatus* Peale.

THE BURMESE LONG-TAILED NIGHTJAR.

Caprimulgus macrourus bimaculatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 363.

The Burmese race of Long-tailed Nightjar occurs all over Burma from the extreme North to the Malay States. To those who can find grounds for the separation of *bimaculatus* into further races our Burmese birds would come under the name *ambiguus* of Hartert.

Like other forms of this species, it frequents both open forest, scrub-jungle, fairly clear country and mixed bamboo- and scrub-jungle. They are very fond of broken ravines, more stone and rock than bush and grass, but they generally lay their eggs under the protection of some rock or vegetation, though some birds deposit them among stones or on the bare earth with no protection of any sort near them. In Burma Bingham says that "it is common in the Thoungyeen Valley even in dense evergreen forest." He took two pairs of the eggs "in a dense bamboo-forest, just above my tent, there being lots of fallen bamboos."

Hopwood and Mackenzie took a fine series of the eggs from Tavoy in the South to Arakan and the Chin Hills in the North. Most were laid on the ground in scrub-jungle, especially if there were ravines running through it, while they also often found it breeding in bamboo-jungles, sometimes very dense, sometimes quite open.

They are early breeders. In Siam Herbert found eggs from February to May, and Hopwood and Mackenzie in Burma obtained all theirs between the 2nd February and the 28th April, one nest only being taken later, on the 1st May.

In ground-colour the eggs vary from very pale yellowish-creamy to a warm cream-pink or pinkish-buff. They are marked, usually quite faintly, with blotches of lavender-grey or reddish-grey, varying

little in depth of colour and never standing out at all boldly. In a few eggs the marks may be definitely reddish and, when this is the case, the contrast between them and the secondary grey blotches is more decided.

I have only two clutches in a large series which are at all unusual. These are a very rich salmon-red in ground-colour, with fine primary blotches and smears of chestnut-red and secondary ones of lavender-pink. In three eggs the markings are scattered thickly all over the surface, but in the third they are nearly all confined to a ring at the larger end.

Sixty eggs average 31.3×22.6 mm.: maxima 34.0×22.4 and 32.2×24.0 mm.; minima 28.0×22.0 and 30.3×21.0 mm.

(1622) *Caprimulgus macrourus andamanicus* Hume.

THE ANDAMAN LONG-TAILED NIGHTJAR.

Caprimulgus macrourus andamanicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 363.

This race is confined to the Andamans, where it is very common in open Teak-forest, open glades and even in almost open country with a few scattered trees growing here and there. Osmaston collected a wonderful series of the eggs of this bird, the great majority of these being laid in the most open portions of the Teak-forests or in cleared openings in among them. The eggs were laid on the fallen Teak-leaves, with no particular protection close to them.

The eggs taken by him were all found between the 29th February and the 9th April.

In colour they are typical *macrourus* eggs but, as a series, they often have much larger smudges. One egg of a pair has a huge chestnut patch covering nearly a quarter of the egg on one side, while the other has one or two very large pale brown patches and others, even bigger, of lavender-grey. Yet another egg has the smaller half one mass of twisted lines of dark chestnut-brown over a haze of pale lavender and pinkish-grey.

Osmaston often found a single egg only laid by this Nightjar.

Thirty-two eggs average 28.8×21.9 mm.: maxima 31.8×20.6 and 29.0×22.2 mm.; minima 27.3×21.6 and 31.8×20.6 mm.

(1623) *Caprimulgus macrourus albonotus* Tickell.

THE INDIAN LONG-TAILED NIGHTJAR.

Caprimulgus macrourus albonotus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 364

This very fine Nightjar ranges over North-West India from the North-Western Provinces to Kunnan, the Simla States and Garhwal. It is curious that the birds found in Southern Assam are nearer to this race than they are to *hodgsoni*, the race found North of the

Brahmapootra. It breeds in the Bihar plains but not in the hills, and may also breed in the United Provinces and the greater part of Northern Continental India. Kinloch records their breeding in the Nelliampathy Hills, but here *atripennis* should be breeding and *does* sometimes breed. The eggs taken by Kinloch are quite typical, however, and not in the least like those of *atripennis*.

It occurs in the hills up to some 5,000 feet and less commonly up to 7,000.

This bird undoubtedly prefers for breeding purposes dry stony ravines or dry water-courses running through comparatively open country, bamboo- or scrub-jungle, or through somewhat thicker Pine- or evergreen forest, which, however, stops short at the edge of the ravine.

I have taken very many eggs of this Nightjar and nearly all have been in ravines or in stony patches of bare ground. Often they are laid quite in the open, sometimes under the shade of a rock or bush or clump of bamboos. The eggs are very difficult to see, more especially when they are lying among or on dead leaves or among small brownish pebbles.

They are early breeders. In South Assam I have taken eggs from 3rd March to the 18th May, most eggs being laid in early April. In Bihar Ollenbach found them laying in March. In Dehra Dun they also breed in March but Betham took a good many pairs of eggs in June. In Kuman Whympers obtained eggs in March and April.

The China-white eggs described by Hutton as those of this bird must be wrong, and as they come from an area in which *C. e. unwini* breeds they are probably those of that bird. The pale creamy or buff eggs are, however, correct. The eggs are in fact like all other eggs of *C. macrourus* (except *atripennis*), ranging from pale creamy to deep rich salmon-buff, with the usual markings of reddish and grey.

I have taken four eggs of this bird lying all together, but have no doubt they were two layings, two being addled and the other two fresh.

Fifty eggs average 32.2×23.0 mm.: maxima 34.5×24.3 and 34.4×25.3 mm.; minima 29.0×22.0 and 31.6×21.2 mm.

(1624) *Caprimulgus macrourus hodgsoni* Stuart Baker.

THE NEPAL LONG-TAILED NIGHTJAR.

Caprimulgus macrourus nipalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 365.
Caprimulgus macrourus hodgsoni, ibid. vol. viii, p. 681.

This race of Long-tailed Nightjar, rather doubtfully distinct from the preceding, takes the place of that bird in the Himalayas from Nepal and Sikkim to Eastern Assam, North of the Brahmapootra.

It keeps to much the same kind of country as the Indian bird and breeds in the same sort of places, but there is very little on



CAPRIMULGUS INDICUS INDICUS.

The Indian Jungle Nightjar.

(Fort Minto. Reheated. 1905.)

record about it. Stevens says that in Sikkim he did not come across it above 4,000 feet, and Shaw obtained eggs at 2,500 feet in the Tista Valley. It breeds in the foot-hills North of the Brahmapootra, and Primrose obtained it breeding both at Sandpur and on the Mornai Tea Estate in Goalpara.

It is an early breeder, and all the eggs I know of have been taken between the 4th March and 14th April.

They are of course indistinguishable from those of the other races. Twelve average 31.5×22.7 mm. : maxima 35.0×23.4 mm. ; minima 27.4×22.0 mm.

Caprimulgus indicus.

THE JUNGLE NIGHTJAR.

(1625) **Caprimulgus indicus indicus** Lath.

THE INDIAN JUNGLE NIGHTJAR.

Caprimulgus indicus indicus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 366.

This Nightjar is found over nearly the whole of India South of the Himalayas with the exception of the South of Travancore. It does not occur in Sind nor in the desert regions of Rajputana nor in the hills of Assam, where, both North and South, its place is taken by *C. i. jataka*.

It is a bird of the jungles and forests more than of the open country, but occurs in the latter also wherever it is well wooded or has ample scrub or bamboo cover.

In spite of its being such a common and widespread bird there is not much recorded about its breeding. Butler found it breeding commonly about Mt. Aboo ; Rhodes Morgan says it breeds in all the forests and thick brush-wood jungles of Southern India, while Taylor found it equally common in Mysore. Hutton also took eggs below Mussoorie and Blewitt in the Central Provinces.

It is common in the Nilgiris up to about 4,000 feet, and many eggs have been taken there by Cardew, Primrose, Packard and others. In the Himalayas Whympers found it breeding around Naini Tal at about 3,000-4,000 feet, and Osmaston took a pair of eggs at Pachmarhi at 3,500 feet.

Everywhere it seems to prefer ravines and stony patches in forest to any other place for breeding purposes. Cardew says that it breeds freely in the "sholas" in the Nilgiris, laying its eggs in the ravines or river-beds at the bottom. Campbell also says that it deposits its eggs in open stony patches in the ravines in "sholas." It also often lays in dense shrub-jungle, the eggs being laid under some thick bush ; at other times it breeds in matted bamboo- and bush-jungle, the eggs being laid upon the fallen debris, when they are very hard to find unless the bird rises, as it usually does, at one's feet.

The breeding season is from March to May, but Primrose in the Nilgiris and Kinloch in the Nelliampathy Hills found eggs laid in February. I have eggs in my own series dating from the 7th February to the 18th May.

In colour the eggs are so like those of the various races of Long-tailed Nightjars that many mistakes in their identification have been made, and I cannot say how they may be discriminated. Perhaps as a series the tint of the ground-colour is warmer, though I have some pairs of *macrourus* darker than any I have seen of *indicus*. An extraordinary pair of the latter taken by Pitman in the Central Provinces has a very pale clay ground with a few blotches of umber-brown and others of pale neutral tint, mostly in a broad irregular ring round the larger end.

Thirty-eight eggs average 30.4×21.3 mm.; maxima 34.0×22.8 and 33.0×24.0 mm.; minima 28.3×21.3 and 28.5×20.1 mm.

(1026) *Caprimulgus indicus jotaka* Temm. & Schl.

THE JAPANESE JUNGLE NIGHTJAR.

Caprimulgus indicus jotaka, Fauna B. I., Birds, 2nd ed. vol. iv, p. 367.

I still retain this Nightjar as a race of *indicus* because I can find no character by which I can separate it. At the same time its eggs are so utterly unlike the eggs of any other race of *indicus* that I cannot help feeling it is wrongly included in that species.

Within Indian limits it breeds in the Sub-Himalayas from Kuman to Assam, while its extra-limital breeding range extends to North China, the Amur and Japan.

This Nightjar was extraordinarily common in the North Cachar Hills, breeding principally between 1,500 and 2,500 feet, rarely a little higher, and often in the foot-hills and even the adjacent plains. I have found the eggs deposited in almost every kind of forest other than deep evergreen, though they may be often taken from open glades or from patches of cultivation surrounded by such forest. The favourite breeding sites are ravines either in scrub, secondary growth or in thin forest; here they select open patches of stone or rock, accumulations of leaves or bamboo spathes, depositing their eggs on these, sometimes quite exposed, sometimes protected by a stone, stump or hush. One pair of these birds laid their eggs every year under a dense *Bougainvillea* hedge in my garden and, though every year the eggs were taken by vermin, generally Civet cats of sorts, they still stuck to the site, and at last, after I had poisoned two civet cats, actually hatched and reared two young. The eggs were very conspicuous on the brown ground, but the young were invisible, and if one succeeded in finding them they lay absolutely still and flattened out, and were very hard to find again if once the eyes were taken off them.

I have taken eggs from the 23rd March to the end of August, and probably most pairs have two broods. More eggs, however, will be found in April and May than in any other months.

The eggs are quite unlike those of the other races of *indicus* and are just like those of the European Nightjar. Nine out of ten have a white ground and are marbled with primary markings of rather dark grey or greyish-brown, with secondary markings of pale grey. In a few eggs some of the primary markings are nearly black and in a few others these are only secondary markings of very pale grey. In some eggs, on the other hand, there are a few very large dark brown smears and blotches, as much as half an inch in length or breadth. Very rarely indeed the ground has a creamy tinge and, in such eggs, the markings are sometimes more reddish-brown.

One hundred Indian eggs average 30.7×22.7 mm.: maxima 33.1×23.1 and 31.5×23.5 mm.; minima 27.2×20.3 mm.

The female alone seems to incubate by day, but the male takes her place in the early mornings and evenings. Incubation takes sixteen to seventeen days.

(1627) *Caprimulgus indicus kelaarti* Blyth.

THE CEYLON JUNGLE NIGHTJAR.

Caprimulgus indicus kelaarti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 368.

This small race of Jungle Nightjar occurs only in Ceylon and in South Travancore, but there are many birds to be found in Southern India which approach the Ceylon bird very closely in their small size and dark colour.

Nearly all the notes under this name in Hume's 'Nests and Eggs' refer to the Northern form, and very little is known of the nidification of the Ceylon subspecies.

Wait's summary of its habits and nidification is: "Occurs mainly on the hills of the central ranges down to about 3,000 feet, but Legge also found it at the foot of Friars Hood in the Eastern Province.

"It is to be met with chiefly on the patanas, open forest glades and 'elias' of the higher hills. It is noisiest in the breeding season, which is about April and May. The usual two eggs are laid on the ground under a bush."

Bourdillon says that in Travancore "it breeds in March-May and prefers grass-land at the edge of forest." Wait, Phillips and Tunnard have all taken its eggs in Ceylon, and these are just small replicas of those of the Indian Jungle Nightjar and seem to be laid in similar places.

Generally speaking the breeding season seems to be March to early May, but Phillips took one pair of eggs on the 8th July.

Twelve eggs average 28.1×20.7 mm.: maxima 29.9×21.6 mm.; minima 26.8×20.0 mm.

(1628) *Caprimulgus mahrattensis* Sykes.

THE SIND NIGHTJAR.

Caprimulgus mahrattensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 365.

Sykes's Nightjar breeds in Sind, Baluchistan and the North-Western Provinces, but probably not much farther East, though it has straggled as far as Purnea in Western Bengal, while Betham found it breeding around Ferozepore.

Ticehurst says of this Nightjar :—" In the better cultivated parts of Upper Sind and the Indus and canal areas it is quite numerous, but in the more desert parts it is never very commonly met with; yet it cannot be considered rare. In the breeding season it is very partial to what is known as 'kuller' ground, that is, almost sterile ground impregnated with salt from evaporation from inundation, in which a certain amount of tamarisk jungle exists. The nests, according to Mr. Bell, are sometimes right out in the open, sometimes shaded by an overhanging tamarisk bough."

Eates found them in both Lower and Upper Sind, and says that the eggs were generally "laid in tracts of 'Kalur' (salt deposits) deposited on the ground under the shade of stunted 'Kandi' and tamarisk." In Ferozepore Betham found it to be "fairly common on the banks of the Sutlej, breeding in scrub-jungle." About Thal Rattray obtained their eggs in rocky nullahs on the bare hillside, while Nurse, who took their eggs near Karachi (he thought they were *asiaticus*), says that they were "taken on sandy desert near the canal in among small thorn-bushes, but very bare." In the Punjab Wait obtained nests at Phillour in March and April and again in June. Finally Pitman took two pairs of eggs near Dehra Ismail Khan "on a bare stony hillside."

They lay from March on to July; in most places they are late breeders, eggs being laid in June and July, but Munn, Eates and Bulkly all took eggs in March, April and May also.

The eggs are easily distinguished from all other Nightjars' eggs. The ground is a grey-white, very rarely with the faintest tinge of cream, and they are mottled all over with fairly dark grey, occasionally a slightly brownish-grey, with the usual secondary cloudings of pale grey. As a whole they give one the impression of thickly mottled grey eggs, not marbled or spotted.

Thirty-six eggs average 28.8×20.9 mm.: maxima 30.5×21.9 and 28.9×22.0 mm.; minima 27.1×21.1 and 27.9×19.6 mm.

I have had many clutches of eggs sent me as being those of the Sind Nightjar, taken on the same ground, the same day, as others which are undoubtedly of this bird. These eggs are just small examples of the egg of the European Nightjar and cannot, I believe, be those of the Sind bird. The only time I had a skin sent it was that of *unwini*, and all these white-spotted eggs are probably those of that bird, although hitherto it has not been supposed to breed in Sind.

Caprimulgus monticolus.

FRANKLIN'S * NIGHTJAR.

(1629) *Caprimulgus monticolus monticolus* Franklin.

FRANKLIN'S NIGHTJAR.

Caprimulgus monticolus monticolus, Fauna B. L., Birds, 2nd ed. vol. iv, p. 370.

This Nightjar has a very wide range, being found over the whole of India as far South as Mysore and Travancore. In the North-West it occurs over the greater part of the Punjab but not in Sind; thence East through the whole of Northern India and the whole of Burma about as far South as Moulmain. Birds from the Shan States are nearer the richly coloured rufous Chinese form.

It breeds fairly commonly up to 4,000 feet and sometimes rather higher. Jones obtained eggs in the Bhagat State at 4,000 feet, but Whistler says that it breeds near Simla also. Primrose took several clutches below Darjiling at about 4,000 feet and one pair 2,000 feet higher than this; in the Assam hills it is common up to 3,000, less so up to 4,000, but does breed occasionally up to 6,000 feet. Near Dehra Dun Osmaston found it very common between 1,000 and 2,500 feet.

About this latter place they nearly always breed in dry water-courses where there are tufts of grass about. This predilection for grass seems very general. In Sylhet Primrose found them breeding in some number in the "grassy and stony tilas round the tea-garden," "tilas" being small hills (Journ. Bomb. Nat. Hist. Soc. vol. xiv, p. 594, 1893).

In the Bombay Presidency, again, Davidson records them as breeding "in open waste ground, often stony and bare but with coarse grass growing over it."

In Burma Davison says it breeds in forest: "The forest is very scanty, being composed of moderate-sized deciduous trees, interspersed with thorny bamboos and brambly shrubs, but with little or no undergrowth." In the hills of Assam I saw more birds breeding in jungle than in the open, but even here they often chose hill-sides with long grass growing over them but interspersed with bare stony patches here and there, where the birds laid their eggs.

In the Punjab they sometimes breed in very open stony ground. Wait (Journ. Bomb. Nat. Hist. Soc. vol. xxxi, p. 821, 1926) writes:—"This species frequents stony hills lying between two and three

* I can find no special character from which a trivial name could be given to this bird beyond the wholly white outer tail-feathers. I therefore retain the old name.

thousand feet, from which small ravines, well covered with 'Phulak' (*Acacia modesta*) and wild olive-trees and bushes of various kinds, lead down into cultivated valleys. The hills themselves are bare except for a small, thick-set and thorny bush called 'Kandu' (*Gymnosporia zeyliana*). The eggs are laid on stony ground, dotted with small bushes, in close proximity to a ravine. The eggs rest on bare ground among the stones, at the foot of, or fairly close to, a small bush or plant."

The eggs are of the *indicus* type, with the ground varying from pale salmon-pink to very rich deep salmon blotched in the usual manner with deeper red and red-brown with underlying marks of lavender-pink.

In shape and texture the eggs are normal but the surface is—on an average—more glossy than it is in most Nightjars' eggs.

(1630) *Caprimulgus asiaticus* Lath.

THE COMMON INDIAN NIGHTJAR.

Caprimulgus asiaticus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 372.

This Nightjar is found over the greater part of Ceylon, India and Burma, in the last country as far South as Tenasserim. In India it is absent from some of the driest areas such as the deserts of Rajputana and Sind, though even in the latter country Sir Evan James recorded it as not uncommon about Sehwan. Herbert also found it breeding near Samkok and Bangkok in Siam.

The birds breed in almost any kind of country other than actual forest and at all elevations from the plains to about 6,000 feet. Its eggs have been taken in open uncultivated waste land, bare and stony, dotted with small shrubs or covered more or less with short stubbly grass. Sometimes they have been found in fallow-land or in low crops; often in thin bush or in thatching grass-land; at other times in thin mixed scrub- or bamboo-jungle and not infrequently even in deciduous forest. Major Cock records finding them in a "thick, dark piece of jungle"; Thompson found them "in a quite unsheltered spot in the middle of a dry pebbly nullah and sometimes at the base of a dead wall." In Siam Herbert once found a pair breeding in a garden but, generally, in open waste land or in scrub-jungle.

Over the whole of the area occupied by this Nightjar there seems to be two regular seasons, first March and April, and secondly the middle of June to the middle of August. At the same time eggs may be found in almost any month of the year. Herbert in Siam, Venning in Burma and myself in Bengal have taken eggs as early as February; Davidson found them still breeding freely during September in Kanara, and I have heard of odd clutches being taken in January and November.

The eggs, except for being so much smaller, are just like those of *macrourus*, pale stone-cream to deep salmon-buff in ground-colour, with the normal primary blotches of red and reddish-brown, with others underlying of pale grey and pinkish-lavender. An egg taken by Wait in Ceylon is very handsome, the ground is a bright pale salmon, while the primary marks consist of a few huge blotches and smaller specks of deep chestnut-red and still larger secondary ones of pale lavender-pink. A pair taken by Herbert is a great contrast to this, the markings being almost invisible, the whole egg appearing to be a rather bright terra-cotta brick-red.

One hundred eggs average 26.5×19.9 mm.: maxima 28.3×20.7 and 28.2×21.0 mm.; minima 24.0×20.0 and 26.2×18.3 mm.

Lyncornis cerviniceps.

THE GREAT EARED NIGHTJAR.

(1631) *Lyncornis cerviniceps cerviniceps* Gould.

THE BURMESE GREAT EARED NIGHTJAR.

Lyncornis cerviniceps cerviniceps, Fauna B. I., Birds, 2nd ed. vol. iv, p. 374.

This beautiful bird is found from Assam, South and East of the Brahmapootra; Chittagong and Tippera in Eastern Bengal; Manipur, the Lushai Hills and all Burma from the Chin, Kachin and Shan States to Tenasserim, and thence through the North of the Malay States. It also occurs in South-West Siam.

It is a bird of forests, but is often found in thin scrub, bamboo-jungle and especially in thin secondary growth surrounded by forest. Hopwood, writing to me of its haunts in Burma, says:—"The jungle was high forest, the trees consisting of Teak, *Xylia dolabriformis*, *Terminalia*, *Homalium* etc., with bamboos, mostly *Stephalostachium pergracile*; in fact typical hill forest moderately dense. The situation in which the birds were breeding is a hill range between the Chindwin and Myittha Rivers. The forest is 10 or 12 miles wide, bounded on either side by open plains and cultivation, so it is evident that the birds breed in the high forest by preference and not of necessity."

In one month, March 1907, Hopwood found no less than five eggs in this piece of forest.

Davison, who was the first to find this bird's egg, took it in "thin tree-jungle, almost free from brushwood, close to the village of Malawan."

Mackenzie took two eggs, one near Katha and one in Mergui in forest much like that described by Hopwood; but two other eggs taken by him in the Upper Chindwin in April were both found in bamboo-jungle; the only other egg I have was sent to me as an

Owl's egg from the Northern Malay States. The "Owl" was described as "an extraordinary bird; she had a long tail and two upright ears and was very dark coloured," the present bird of course.

The breeding season, so far as we know at present, is from January 10th (Davison) to April 20th (Mackenzie). This last egg was almost hatching when taken.

There is no nest, the single egg being laid on the bare ground, though nearly always under the shelter of a clump of bamboos or a thick bush.

The eggs are typical Nightjar's eggs and very beautiful when fresh, though they soon lose much of their colour. The ground varies from a pale yellow-cream to a beautiful rosy-salmon of considerable depth. The markings vary much *inter se*, but the surface is never heavily marked. Most eggs are marbled with pale grey. Some have this pale grey marbling only, while one or two have in addition further marbling and veining of pale bright reddish. One quite exceptional egg has, besides the very faint grey marbling, a few bold spots of red and reddish-brown at the larger end.

In shape the eggs are broad to long ellipses, only one showing distinctly smaller at one end. The texture is finer, closer and more fragile than in the eggs of *Caprimulgus*, and there is always a fine gloss.

Six eggs average 42.1×30.5 mm.: maxima 44.1×31.3 mm.; minima 39.0×31.0 and 41.5×29.0 mm.; an abnormally small egg measures only 35.3×26.9 mm. This is not included in the average.

The bird sits close and will sometimes remain on her egg until almost touched, staring wide-eyed at the intruder.

Nothing has yet been recorded as to manner or duration of incubation.

(1632) *Lyncornis cerviniceps bourdilloni* Hume.

THE TRAVANCORE GREAT EARED NIGHTJAR.

Lyncornis cerviniceps bourdilloni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 375.

So far this Nightjar has only been recorded from South and Central Travancore. The only two persons to take the eggs or, indeed, who really know anything about this bird are Bourdillon and Stewart, who both say that, when once one recognizes the curious wailing cry of this bird and its manner of life, it proves to be a comparatively common bird in almost any kind of cover up to about 2,000 feet. The following notes are compiled from various bits of information given to me from time to time by the above gentlemen.

Although its egg may be found in any kind of cover from thin bush or grass to comparatively thick evergreen forest, yet it is more

likely to be found in some than in others. In the forests nearest Quilon T. F. Bourdillon found the birds most often in thick thorny bush-jungle, whereas Stewart found them sometimes in this but more often on hill-sides surrounded by forest of enormous trees but with not much undergrowth. The eggs were laid under bushes on the deforested hill-sides, often where the bushes were comparatively scanty, rarely where they were very dense. Occasionally they were laid under or close to bamboo-clumps, which sometimes grew here and there in these patches of bush-jungle. The egg is never laid in cultivated tracts, but is sometimes to be found well in the interior of the more open or deciduous forests.

The nesting sites are very hard to find, but an old woman who collected eggs for Stewart had an almost uncanny capacity for finding them once she had located the bird by its weird cry. Only one egg is laid, on the ground just as with other Nightjars, and the bird sits very close, not leaving until almost trodden on, a tragedy not impossible, as the sitting bird blends so wonderfully with the fallen leaves and débris where the egg is laid.

The principal nesting months are February and March, but Stewart has taken eggs from the first week in January to the 1st of May.

A most wonderful series of eggs collected by Stewart show as great variety in proportion to their numbers as do the small series known of the Burmese bird, from which, of course, they cannot be distinguished. Individual eggs worthy of special description are the following :—

- (1) Unicoloured rich salmon-cream.
- (2) A rich salmon-cream ground marked with large straggling blotches of rich chestnut.
- (3) Similar, but speckled and not blotched.
- (4) Beautiful rosy-salmon, with a broad band of lilac diagonally surrounding the egg and, at the larger end, a blood-red line encircling it nearly twice.
- (5) A cream ground, marbled at one end densely with brown and elsewhere clouded with grey.
- (6) A pigmy egg, uniform creamy white.

Forty eggs average 40.0×28.8 mm. : maxima 43.8×30.0 and 43.3×31.5 mm. ; minima 36.0×28.4 and 38.2×27.0 mm.

A pigmy egg measures only 36.0×23.0 mm.

Suborder PODARGI.

Family PODARGIDÆ.

(FROGMOUTHS.)

Batrachostomus javensis (Horsf.).

THE JAVAN FROGMOUTH.

(1633) **Batrachostomus javensis hodgsoni** Gray.

THE SIKKIM FROGMOUTH.

Batrachostomus javensis hodgsoni, Fauna B. I., Birds, 2nd ed. vol. iv, p. 378.

This curious bird is found in the Outer Himalayas from Nepal and Sikkim to Eastern and Southern Assam. East of that Province it is found in all the hill ranges of Burma from the Shan States and Karenni to Tenasserim. It is common in Manipur and the Hill Tracts of the Eastern Bengal districts.

This species is a bird of the darkest, most humid forests in North Cachar between 2,500 and 6,000 feet, and in Lakhimpur as low as 1,000 feet. In Sikkim it also frequents the same kind of forest between 3,000 and 6,000 feet. It is only in the Khasia Hills that I have seen the bird in any other kind of forest, and there it is not rare in Pine-forest, but it will only be found in the densest and most dark of these. Light it abhors and, when caught and placed in sunlight, it is practically helpless. Mandelli took nests and eggs of this bird in Sikkim, while Hodgson gives a correct account of its breeding in Eastern Nepal.

I have taken many nests and have seen many more, all of which have been absolutely alike and have also been built in similar positions. The site selected is invariably a bare, or practically bare, horizontal branch of a tree and always one between 5 and 15 feet from the ground. The branch may be one of considerable size or it may be very thin, though in most cases it will be found to measure some 2 to 4 inches in diameter; in addition to being suitable in position it must also be more or less covered with lichen or have very rough broken bark, and I have never seen a clean green branch selected. Occasionally it is placed close to the trunk of the tree or an upright twig, but more often well away from either.

Hume says that a nest examined by him was made of tiny soft rootlets, but every nest I have seen has been composed entirely of the soft fluffy down from the breast and abdomen of the birds, that from both the male and female being used impartially. The

down is wedged very firmly into the crevices in the rough bark, and then the little round pad of a nest is built up from it, generally sitting astride of the branch as it were, with the outer edges coming an inch or so down the sides of the branch. When the down pad is completed the exterior is coated all over with spiders' webs, lichen and tiny scraps of moss, so as to exactly resemble the branch on which it is placed. If the branch is just covered with rough bark externally without lichen or moss, then tiny fragments of bark are picked off the branch and fastened on to the nest instead of the other materials. Looked at from below or from one side the nest looks just like a small natural excrescence. The nests vary greatly in size, but an average nest is between $2\frac{1}{2}$ and $2\frac{3}{4}$ inches in diameter and from $\frac{3}{4}$ to $1\frac{1}{2}$ inch deep at the side. The cup is very shallow, not exceeding half an inch in depth, while it may be about $1\frac{1}{2}$ inch in diameter. The larger the nest the more shallow as a rule. One measuring $3\frac{1}{2}$ inches across, a very exceptional nest, is only about half an inch deep, the bottom of the nest, where it rests on the higher part of the branch, being so thin as to be almost transparent. The nest is very compactly made and feels like a pad of soft felt, but it takes great force to tear it apart or to wrench it off the branch, while it retains its elasticity and shape for endless years.

The breeding season is April, May and June, and I have seen fresh eggs from the 13th April to the 2nd July. They are not double-brooded but, if eggs are taken and the nest left, the birds will sometimes lay again in it.

Hume mentions receiving a single hard-set egg from Mandelli, but normally two eggs are laid, never more. They are pure white, in shape long ellipses, rarely a little compressed at one end and in texture very similar to Barbets' eggs. The grain is fine and close, but rather porous and never glossy, being silky to the touch as in the Barbets' eggs.

Thirty eggs average 26.5×17.6 mm. : maxima 28.1×19.5 mm. ; minima 24.4×16.3 mm.

During the day the cock bird does nearly all the work of incubation and sits so close that I have more than once caught him by hand on the nest. The female apparently sits for an hour or two before dawn and again in the evening after dusk.

Both birds assist in making the nest, pulling the down from their lower plumage and welding it into the branch and then into the nest itself.

(1634) *Batrachostomus affinis* Blyth.

THE MALAY FROGMOUTH.

Batrachostomus affinis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 380.

This Frogmouth has once occurred within our limits, having been obtained near Thoungyeen in Tenasserim. It is found throughout the Malay Peninsula, South peninsular Siam, Sumatra and Borneo.

Like all other Frogmouths they are birds of deep evergreen forests in low hills, probably principally between 1,000 and 5,000 feet, and from their retiring and nocturnal habits considered far more rare than they really are.

Two nests of this bird were obtained by Kellow near Simpang, one with two and one with one fresh egg, on the 16th February and 15th March respectively.

The nests were built on branches of small saplings beside a stream in dense evergreen forest and are in appearance exactly like those of the preceding bird, but are very small, measuring only about 2 inches in diameter by $\frac{3}{4}$ inch or rather less in depth.

The three eggs measure 23.2×16.3 , 23.9×16.9 and 24.5×17.2 mm.

They are pure white and of the same silky texture and elliptical shape as those of *hodgsoni*.

A nest of this bird is in the Selangor Museum, together with the fragments of an egg, but without any data.

(1635) *Batrachostomus moniliger* Layard.

THE CEYLON FROGMOUTH.

Batrachostomus moniliger, Fauna B. I., Birds, 2nd ed. vol. iv, p. 381.

This Frogmouth occurs from the Wynnad South through Travancore to the whole of Ceylon.

The breeding habits of the Ceylon Frogmouth are much the same as those of the Sikkim bird except that it is not found so exclusively in evergreen forest. The nest was first found by Bourdillon in Travancore and, since that was recorded, a magnificent series of nests and eggs has been collected by J. Stewart.

According to his notes, supplied to me from time to time with eggs, the Frogmouths seem generally to breed in deep forests which are dark and shady but occasionally in deciduous and more open forest. They were most common at about 2,000 feet, but were found up to 4,000 and, again, nearly down to the level of the plains. The nests were just like those of the Sikkim Frogmouth, small pads of down from the lower surface of the bird's plumage welded into very tough, felt-like pads fixed to the upper surface of a horizontal bough of a tree at any height between 6 and 15 feet. Internally the only material used is the birds' down, but externally the nests are covered with scraps of green moss, lichen or bark, rendering them almost indistinguishable from the branch on which they are placed. The pads vary in size from $1\frac{1}{4}$ to $2\frac{1}{4}$ inches across by about $\frac{3}{4}$ to $1\frac{1}{4}$ in depth, the internal egg-cavity being merely large enough to receive one egg, roughly about $1\frac{1}{4}$ inch in diameter by $\frac{1}{2}$ an inch or less in depth.

The normal breeding season is January to April, but odd eggs have been taken by Stewart in the months June to September. In

Kanara Bell took eggs in March. Only one egg is laid, quite typical of the family, but much larger in proportion to the size of the bird than either of the two preceding races.

Thirty eggs average 29.9×20.6 mm. : maxima 31.1×22.0 mm. ; minima 27.6×19.0 mm.

The birds sit very close, but will not allow themselves to be caught by hand, though they have no objection to being photographed at very close quarters. The cock bird in this species, as in *hodgsoni*, seems to do most of the incubation by day.

Suborder STRIGES.

(OWLS.)

Family TYTONIDÆ.

(BARN-OWLS.)

Tyto alba Scop.

THE BARN-OWL.

(1636) *Tyto alba javanica* (Gmelin).

THE JAVAN BARN-OWL.

Tyto alba javanica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 335.

Hartert having separated our Indian race of Barn-Owl as *T. a. stertens*, the range of the present form is greatly restricted. It occurs within our area in South Tenasserim only, whence it extends East to Siam and the Indo-Chinese countries. Hartert (Nov. Zool. vol. xxxiv, p. 98, 1929) considers the Indo-Chinese birds doubtful, while Delacour ('Des Oiseaux de l'Indo-Chine,' vol. ii, p. 147), rightfully, I think, groups them all under this race.

It is resident of course, and breeds wherever it occurs, but I can trace nothing on record as to the breeding of this race, though I have two notes on its breeding in Bangkok by Herbert and Williamson. The former writes :—"The Barn-Owl is very common in Bangkok, and is found nesting in roofs of 'watts' and bungalows or in hollow trees. No nesting material is used, the eggs being deposited on the bare wood or material of the ceiling. Five eggs in the usual complement, and occasionally six. The average size is 43.0×33.5 mm."

Williamson, when sending me a clutch of seven eggs, noted :—"A clutch of seven laid on 15. 2. 23, of which three were hard set,

one cracked and three fresh. They were laid on the bare boards under the eaves of the roof of Mr. Lyle's house. I took a clutch from the same place two years earlier, the eggs being laid on a thick mat of debris, consisting of bones of rats and mice. This was cleared away when the nest was taken, and on the present occasion I found merely a number of pellets on the boards near the eggs."

The breeding season is apparently December to February, the only five clutches of which I have record being all laid between the 19th December and 15th February.

The number of eggs varies from five to seven and are, like all Owls' eggs, white with a close fine texture for the size of the egg, a smooth satiny surface, sometimes with a faint soapy-looking gloss. Owls' eggs are normally very round, but those of the present bird are less so than most; even these, however, are never long ovals or pointed at the smaller end, being generally short broad ellipses.

Twenty eggs average 43.1×33.5 mm.; maxima 45.3×33.5 and 40.1×34.1 mm.; minima 40.1×34.1 and 41.3×32.2 mm.

(1636 a) *Tyto alba stertens* Hartert.

THE INDIAN BARN-OWL.

Tyto alba javanica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 385 (part.).

Tyto alba stertens, ibid. vol. viii, p. 681.

This is a resident breeding species over the whole of India and Northern Burma as far South as Northern Tenasserim. It is also found in Ceylon, but the bird there seems to average smaller and to be a trifle more richly coloured.

As in Europe, so in India, the Barn-Owl is a bird of towns and villages or woodlands in their vicinity. Preferably they breed in buildings, often in the roofs of houses, holes in walls of houses, mosques and temples, but they also breed in holes in all sorts of other places. Calbertson found eggs laid in a hole in a river-bank. Hume says that their favourite locality for a nest is a well, and Betbam (Jouru. Bomb. Nat. Hist. Soc. vol. xiv, p. 145, 1902) says that round about Poona he also found them constantly breeding in old wells. Very often they deposit their eggs in natural hollows in trees, and Legge says that in Jafna, in Ceylon, he found them "nesting in the drains in the escarpment of the Fort ditch." They have also occasionally been found breeding in holes in banks.

No nest is made, but the birds return year after year to the same place for breeding purposes and, in time, an enormous mass of broken pellets and the remains of rats, mice, bats and small birds, principally Sparrows, accumulates, and the eggs are deposited on the top of this.

It is difficult to say what months constitute the chief breeding season. In Assam I found they bred from December to May and

did not breed in the later months of the year. Elsewhere, however, they seem to breed in almost any month, but more especially December to March and then again after the Rains break in June.

In the Central Provinces Hume says they lay from November to January. Round Poona Betham took fresh eggs in November and half-grown young in December. In Burma Oates took fresh eggs in January. At Lahore Currie found them breeding in July, October and November, finding young in all these months. Finally, in Ceylon they are recorded as breeding in June and July.

The eggs are said to number three to six, but I think the smaller clutches are simply incomplete, for five to seven seems to be the normal number of young birds, and I have seen no incubated clutch numbering less than five. The eggs are laid very intermittently, often two or three days elapsing between the deposition of the first and second halves of the clutch, while in others there seems to be three or more stages of laying, as I have seen young in three very different stages of size and down.

Thirty-eight eggs average 40.7×32.5 mm. : maxima 44.9×33.6 and 40.8×34.9 mm. ; minima 38.6×32.0 and 39.9×31.0 mm.

Incubation, I think, lasts twenty-four days or rather more, but it is difficult to determine owing to the irregular laying.

Tyto longimembris.

THE GRASS-OWL.

(1638) *Tyto longimembris longimembris* Jerdon.

THE INDIAN GRASS-OWL.

Tyto longimembris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 387.

The Grass-Owl frequents the immense grass stretches of low hills and plains of the Sub-Himalayas from Dehra Dun to Eastern Assam ; Bengal and Bihar ; Balaghat and Raipur in the Central Provinces ; Southern India in Nellore, Carnatic, the Nilgiri and other hill-ranges ; the plains and hills of Northern Burma to the Shan States, where Livesey says "it is common on the big Loikaw-Karenni plain."

This is a comparatively common bird in Bihar, where, in Hume's time, Parker took several nests and, in more recent times, Coltart and Inglis obtained many more. Here the nests were always in wide extents of grass-land which might be anything from 2 to 10 feet high but, generally, 3 or 4. There is no real nest, but the eggs are laid on a pad of grass beaten down and matted together so as to form quite a good bed for the eggs to lie on, an inch or two above the actual ground.

In North Cachar the first nest I ever took was in quite an unusual place. I was coming home after a long and weary day's tramp

after Gaur, trudging through long grass covering one rolling hill after another. In between the hills were ravines or beds of streams, and when climbing down the steep sides of one of the latter I put my foot on something which squeaked and struggled. Putting my hand down I grasped a bird, which proved to be a Grass-Owl, sitting on a clutch of four eggs. Here the grass was quite short, but the eggs lay under the protection of a rock against which my foot had wedged the bird. This is the only occasion on which I have known the birds to breed on a place other than comparatively flat, while, in this instance, the nest was quite a well-made saucer of dried grass-blades, purposely collected by the birds, for all around was quite green.

In the plains of India this Owl breeds from October to March, most eggs being laid in October and November, but in Cachar I took the nest above referred to on the 3rd July. In these hills I think the birds probably breed from May to June, after the spring jungle-fires are over and the grass has had time to grow again long enough to screen the nest and eggs.

In Kuman Whympyer found them breeding in November, taking a clutch of six eggs on the 5th of that month.

The full clutch of eggs is four to six, but four only is, perhaps, exceptional. They could not be distinguished from Barn-Owls' eggs.

Forty eggs average 39.9×32.7 mm. : maxima 42.7×33.6 and 42.1×34.0 mm. ; minima 36.0×30.0 mm.

One often finds both male and female sitting close together when one flushes them off their eggs but, so far as I know, only the female carries out the duties of incubation.

***Phodilus badius* Horsf.**

THE BAY OWL.

(1640) *Phodilus badius saturatus* Robinson.

THE NORTHERN BAY OWL.

Phodilus badius saturatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 300.

This is the race of Bay Owl found from Nepal to Assam, the Chin Hills and possibly the Upper Chindwin and the Northern Shan States. In the Southern Shan States and in Karemi the birds appear to me to be nearer the typical Southern form, though admittedly intermediate.

So far as I know the eggs of this most beautiful Owl have been taken only by myself in the Assam hills, where it was not rare between 2,500 and 3,000 feet, occasionally wandering up to 5,000 feet. It kept to forests almost entirely, being found both in the evergreen forests of North Cachar and the Pine-forests of the Khasia Hills while, occasionally, it might be found breeding in a tree on

the outskirts of these forests. Once only I found a nest-hole in a stump of a tree in very dense thorny bamboo-jungle, with here and there rotted stumps of trees.

The eggs are invariably deposited in natural hollows in trees or stumps and the birds generally select rather large ones, with wide entrances at no great height from the ground. Most of those I have found have been in holes in very rotten stumps at heights between 6 and 15 feet from the ground, but one nest in the Khasia Hills was in a pine about 25 feet up. They seem also to prefer forest which is growing on rugged steep hill-sides. There is no lining to the hole for the eggs to lie on, but as the birds return year after year to the same nest-hole a great accumulation of pellets and remains of food may often be found. These seem to be principally remnants of large beetles, locusts, a few birds and many small mammals, the latter sometimes largely predominating over the others.

The breeding season is March to May. I have never found more than four eggs or young in a clutch and often only three, but one of my collectors in 1933 took two clutches of five eggs which he sent me.

The eggs are the usual round white ones typical of the family, but have, perhaps, a rather exceptionally smooth surface, almost "soapy" to the touch.

Thirty eggs average 34.5×30.0 mm. : maxima 37.0×31.0 mm. ; minima 33.2×29.0 and 36.0×28.8 mm.

(1641) *Phodilus badius assimilis* Hume.

THE CEYLON BAY OWL.

Phodilus badius assimilis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 391.

This race of the Bay Owl is confined to Ceylon. Wait says regarding it ('Birds of Ceylon' 2nd ed. p. 232, 1931):—"This species is nocturnal and lives in forest. The nest has been found on Martin's town estate, near Rakwana. It was made in a hole of a tree, and was composed of dry twigs, moss and feathers. The parent bird and three young were taken from the nest in November, so it would appear to breed towards the end of the year and to lay three eggs."

The nest of twigs etc. sounds rather abnormal for an Owl, and was probably that of a Myna or some other bird of which the Owl had taken possession.

Family ASIONIDÆ.

(EARED and WOOD-OWLS.)

Asio otus.

THE LONG-EARED OWL.

(1642) *Asio otus otus* Linn.

THE EUROPEAN LONG-EARED OWL.

Asio otus otus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 393.

This well-known Owl is found practically all over Europe and North Asia and has once been found breeding within Indian limits. Shelley (Journ. Bomb. Nat. Hist. Soc. vol. x, p. 149, 1895) records this instance as follows:—"While after bear on the hills above Gurais in Kashmir on 4th June, 1895, I found a nest of four eggs of this Owl in a Sycamore-tree, at a height of about 12 feet from the ground, and I also shot one of the parent birds for identification.

"The nest, which was a mere platform of sticks, with no pretence at a lining, had doubtless, from its weather-beaten and dilapidated appearance, been originally occupied by some other bird, probably a Crow.

"The eggs were much incubated and would, I think, have hatched in a few days.

"They are broad white ovals, slightly glossy, and measure 1.62" × 1.35".

"On several occasions I heard Owls hooting in the evening which I believe belonged to this species, so that it is probably not an uncommon bird in Kashmir at suitable elevations.

"The eggs I took were found, so far as I could judge, at an elevation of about 9,000 feet, but I heard the birds lower than this."

Strix aluco Linn.

THE WOOD-OWL.

(1644) *Strix aluco biddulphi* Scully.

THE GILGIT WOOD-OWL.

Strix aluco biddulphi, Fauna B. I., Birds, 2nd ed. vol. iv, p. 397.

The distribution of this Owl is even to-day rather doubtful, and many records of the occurrence in South Kashmir of the next bird, *S. nivicola*, possibly really refer to this one. Whitehead found it



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at Kohat in January and March; Hume obtained one at Peshawar and one at Mardan, while several specimens of Wood-Owls procured by Ward in Kashmir are also referable to this bird.

The only two pairs of eggs in my collection undoubtedly referable to this species were taken by Ward near Sonamerg in May 1904. Both these clutches were laid on the ground on the banks of rocky streams running through forest. In neither case were they in regular caves, but were under large rocks overhanging shallow hollows.

The two clutches differ somewhat in size; one pair measures 48.0×41.0 and 49.8×42.2 mm., the other 53.1×45.5 and 52.3×46.0 mm.

In shape, texture etc. the eggs are quite typical.

Including a fifth single egg the average is 50.6×43.3 mm.

(1645) *Strix nivicola* Blyth.

THE HIMALAYAN WOOD-OWL.

Strix nivicola, Fauna B. I., Birds, 2nd ed. vol. iv, p. 398.

The Himalayan Wood-Owl occurs all along the Outer Himalayas from Murree to Eastern Assam and thence to the Shan States, Yunnan and China East to Peking. I have never seen it in the hills South of the Brahmapootra in Assam.

The first person to take the eggs of this bird was Mr. A. A. Anderson, a clerk in the Secretariat at Simla. In 1913 Ollenbach at Mussoorie and Dodsworth near Simla obtained them and, finally, Jones took several nests round about the latter station.

Dodsworth says that they keep much to dense Oak-forest and his first nest was found in a fairly large cavern in a small cliff, its mouth screened by a mass of brushwood and creepers. This on the 13th May contained one young bird and an addled egg. After this Jones found several nests (Journ. Bomb. Nat. Hist. Soc. vol. xxvi, p. 615, 1919); he says:—"I have found several nests, all of which were in holes in trees from 10 feet to 35 feet from the ground. The eggs are two or three, perhaps more often the latter number; these are laid from the middle of March to the second week in April. I have never found anything but rats in the nest-holes."

Dodsworth says that these birds fight savagely for their eggs and young (Journ. Bomb. Nat. Hist. Soc. vol. xxii, p. 629, 1914). On one occasion "a man peeped into the cave, and before he had time to withdraw himself he found to his horror a large Owl clinging to his chest"; on another occasion "the old bird appeared on the scene and made a most determined attack on him, knocking off his hat and drawing blood from his scalp and face."

Jones thus describes its courtship in the article already referred to:—"Besides the usual hoot, *S. nivicola* has a note which could be produced by placing a blade of grass between the two thumbs and then blowing through them sharply. This, I think, is a love-call.

When the bird utters this note it is usually on the wing, and soars up almost vertically for a few yards, and descends for some distance, with wings closed, gradually opening its wing, and finally sitting on the nearest point of vantage."

The breeding season is from the middle of January to the middle or end of April, two or three eggs being laid. These are quite typical, and thirteen average 48.2×41.6 mm. : maxima 48.9×41.0 and 48.4×42.0 mm. ; minima 45.8×41.1 and 48.2×39.9 mm.

Strix indralee.

THE BROWN WOOD-OWL.

(1646) *Strix indralee indralee* Sykes.

THE SOUTHERN BROWN WOOD-OWL.

Strix indralee indralee, Fauna B. I., Birds, 2nd ed. vol. iv, p. 309.

This Wood-Owl occurs in Ceylon and South India, North to Mahabeshwar. It has also been obtained in Goomsoor and in the Shevaroy Hills, while Sykes's type was a Deccan specimen.

I know nothing about the breeding of this common bird beyond some notes sent me by T. F. Bourdillon with five eggs. Of four he writes to me about the birds under the name of *ocellatum* as follows:—"These eggs were brought to me (4) as being those of a large Owl. The nests were placed on a shelf of a rock in wooded country in the drier part of Travancore. They were taken on the 12th January."

Later he took another egg from the same place on the 1st March which he gave to Stewart and the latter gave to me. All the eggs are marked "*indrani*" in Bourdillon's own handwriting, but seem rather small for this bird. At the same time, *Strix ocellata* has not been found breeding so far South as Travancore, and I think Bourdillon's latest identification is probably correct.

The birds are found from the lowest to the highest hills in Travancore, while in Ceylon it occurs from sea-level to about 4,500 feet, keeping much to the heaviest evergreen forests.

Wait says ('Birds of Ceylon,' p. 235):—"This Owl has been found breeding in the Dimbula district in February; two eggs are laid, either in a hole in a large tree, or in a stick-nest, placed on a rocky shelf, or in the fork of a tree. Four Ceylon eggs average 1.90 by 1.66 " ($=48.2 \times 42.3$ mm.).

It appears from the above notes that these Owls breed from January to March and that two eggs form the full clutch.

Nine eggs, including Wait's four Ceylon eggs, average 49.9×44.1 mm. : maxima 52.2×42.0 and 51.9×43.1 mm. The minima, found in some of Wait's eggs, I have not got, but it will be noticed that the authentic Ceylon eggs are even smaller than those taken by Bourdillon.

• (1647) *Strix indranee newarensis* * (Hodgs.).

THE HIMALAYAN BROWN WOOD-OWL.

Strix indranee newarensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 400.

This fine Owl is found in the Himalayas from extreme West to extreme East. It also occurs in the hills of Northern Burma, but does not extend very far South. I am very doubtful as to the inclusion of the very brown birds from Northern Siam and Annam with this race.

This Owl, like the other members of the genus, seems to be a truly forest bird, and is found from 2,000 or 3,000 feet commonly up to about 8,000, while it has been recorded in Sikkim up to 13,000 feet.

We have two published notes on this bird's breeding. As recorded in Hume's 'Nests and Eggs,' p. 116, he (Hume) found a nest in May "which was in a deep, wooded, precipitous little valley or khud, at the back of Mahasoo (near Simla). It was placed on a shelf projecting from the face of a low precipice; immediately above it projected a large point of rock, from which depended a perfect curtain of bushes, which reached the tops of the trees growing at the foot of the precipice. The nest, the Paharees said, was composed of sticks with a few feathers intermingled, and contained, on the 6th June, three very young birds."

Whympers also reports the finding of a nest of this Owl in Kuman (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 523, 1906):—"I found a nest of the above bird in a deep shady nullah here at about 5,000 feet elevation on February 21st, 1906. It contained two fresh eggs. The nest was merely a hole scraped in the ground at the foot of some steep rocks and was placed behind some scanty bushes. The birds were not at all shy and watched us from such a short distance there was no difficulty in identifying them, and it is a bird I know well." Whympers then goes on to describe how he substituted two hen's eggs, which the Owls duly hatched out. A visit to the nest later showed the two chicks recently hatched and two dead rats provided for their dinner, but two days later again there were no chicks, no rats and no Owls.

Another nest found by Whympers in March was "placed in the hollow of a fork of a by no means large tree standing on the edge of a shady nullah but not itself well shaded; it was about 10 feet up. The single egg it contained was much smaller than the other one. It seems from what I have now seen that the male remains constantly close by the nest, occasionally calling to his mate."

* Robinson and Kloss, who place this Owl in the genus *Bulaca*, consider all our Indian forms to be merely races of *Bulaca leptogrammica* Temminck, from Borneo. They are probably correct in this latter determination, but I should have liked to see more material before deciding. It is a small, richly coloured bird.

I have a pair of eggs and a single one taken by Masson near Darjiling at about 6,000 feet; both were taken from a small cave in a cliff-side. There was no nest, the eggs being laid on the bare ground. The pair were taken on the 4th February and the second laying of one egg on the 19th.

I obtained one abnormally small egg in the Khasia Hills, shooting the old bird; this egg was laid on the bare ground in a Pine-forest on a very steep hill-side. There was no nest and no protection other than a huge Pine standing 2 or 3 feet away.

The breeding season seems to be January to March, my latest date for eggs being the 14th of that month.

Two eggs are laid, sometimes only one.

Sixteen eggs average 56.2×45.9 mm. : maxima 58.3×47.0 mm. ; minima 49.4×41.2 mm. This last egg is abnormally small, and my next smallest is 52.5×43.2 mm.

(1649) *Strix ocellata* (Less.).

THE MOTTLED WOOD-OWL.

Strix ocellata, Fauna B. I., Birds, 2nd ed. vol. iv, p. 402.

This Wood-Owl is found over practically the whole of India from the base of the Himalayas to the Carnatic and to the base of the Nilgiris. It extends East to Lower Bengal but not to Assam, while in the West it does not occur in Sind. It is also absent from the driest and most desert countries without woods and forests.

Its favourite breeding haunts are undoubtedly Mango-orchards, but it has been found nesting—if I may use the term for a bird which makes no nest—in solitary trees in cultivation, in gardens, in roadside avenues, while in Raipur (Central Provinces) Blewitt says that an occasional pair is to be met with in open forest and describes two eggs taken from a tree in such forest.

This Owl deposits its eggs either in hollows in trees or in the hollows formed by the divergence of the greater limbs of trees where they start from the main trunk. The birds make no nest though, naturally, in the uncovered hollows between the boughs many wind-blown oddments may accumulate and form what looks like a kind of nest. They build at almost any height from the ground, but most often between 6 and 20 feet, although Hume gives 25 feet as the limit.

The breeding season is thus summed up by Hume:—"The Mottled Wood-Owl lays in the plains of the North-Western Provinces and the Punjab in February and March, but I have a note of the eggs having been taken in the Doon early in April. In the Central Provinces it lays from November to January."

In Khandesh and the South Konkan Davidson and Vidal took eggs in December, January and February, while in Bihar Coltart,

Inglis and others found them breeding in February and March. In Poona it breeds rather later and Betham took a single fresh egg on the 10th April.

Occasionally this Owl lays three eggs, but the normal full clutch is two.

Hume says the eggs are creamy white. I have never seen any with a cream tint, but they are, like all Owls' eggs, a duller white than such eggs as those of Bee-eaters, Kingfishers etc.

Eighteen eggs average 51.1×42.6 mm.: maxima 54.3×42.1 and 53.2×44.2 mm.; minima 48.2×41.0 mm.

The old birds sit very close, and Cock writes of one he found sitting on its nest in a Mango-tree near Sitapur which refused to leave even when he threw a stone at it.

(1650) *Strix orientalis* Shaw.

THE MALAYAN WOOD-OWL.

Strix seloputo, Fauna B. I., Birds, 2nd ed. vol. iv, p. 403.

Strix orientalis, ibid. vol. viii, p. 682.

This Owl is found from South Burma and Siam, through the Malay States, to Sumatra and Borneo, but not Java, which is occupied by *Strix o. seloputo*; East it extends to Cochin China.

There are only two records of this bird's breeding. Oates, quoted by Hume, writes:—"I have not been fortunate enough to get the eggs of this species, but I have twice found the young birds. The eggs appear to be laid on the bare wood in the fork of a large Popul-tree at no great distance from the ground. A young bird, about one month old, and just able to fly, was taken on the 20th April and another one, rather younger, on the 24th March. Eggs should therefore be looked for at the end of February and the commencement of March."

The only egg known was taken by E. G. Herbert on the 23rd February near Samkok in Siam. Sending me this egg Herbert notes:—"I have only heard of two or three pairs within a radius of 50 miles of Bangkok. The 'nest' was in a large open branch-hole of a living tree, about 25 feet from the ground. There was no nesting material in the hollow."

The egg measures 49.0×41.0 mm.

Subfamily BUBONINÆ.

(All Oriental Owls other than those already described.)

Ketupa zeylonensis.

THE BROWN FISH-OWL.

(1652) *Ketupa zeylonensis zeylonensis* Gmelin.

THE CEYLON BROWN FISH-OWL.

Ketupa zeylonensis zeylonensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 406.

The present race of Fish-Owl is found over the greater part of Southern India, South of a line drawn roughly at about the latitude of Bombay City on the West to the mouths of the Krishna River on the East. It is also common in Ceylon, the type-locality.

The breeding habits of all the Fish-Owls seem to be just the same, so that the description of the nidification of this one serves for all. They frequent both forest and well-wooded open country but will never be found far from water. In Ceylon they keep much to deep forest near streams, but in India they are quite as often found in well-wooded country, and their favourite breeding haunts are undoubtedly densely growing, shady Mango-orchards.

Hume sums up his description of the nests as follows:—"They always nest in the vicinity of water, sometimes choosing a cleft in rocks overhanging a mountain stream, sometimes a broad shelf in the clay cliffs of some river, sometimes a huge cavity in some old banyan-tree, and at times appropriating an old nest of *Haliaetus leucoryphus*.

"Where they make their own nest, on a ledge or a recess of a cliff, it consists of little but a few sticks, mingled with a few feathers, or, when in holes of trees, of a few feathers and dead leaves; but, when they annex an old nest, they seem to line it more carefully with finer twigs, grass and feathers. I have never found green leaves under the eggs of this species."

The above hardly stresses the liking this bird shows to hollows between great boughs of trees for nesting sites. Thus as regards this particular race Blewitt in Raipur found an egg laid "in the hollow of a large mohwa-tree, where two branches had forked off." Again, Vidal records "nine nests found from January to March, all in hollows or depressions in Mango-trees, one or two eggs or young ones in each."

I have also heard of the eggs being laid in a hole in a bank.

When old nests are made use of they are generally those of Eagles and Vultures, and the eggs have often been taken from old nests of the latter very high up. Betham found one in a nest of *Pseudogyps* fully 50 feet from the ground. When in hollows in

Mango and other trees they are generally rather low down, between 10 and 20 feet from the ground.

In Ceylon this Fish-Owl breeds in June, July and August, and Wait says in April also. In India it is exclusively a Winter breeder, most birds laying from the end of November to the end of February and a casual bird or two in March and April.

The full clutch of eggs is two, rarely three and sometimes one only.

The eggs are white, and I have not seen any with the creamy tint mentioned by Hume.

Eight eggs average 58.7×48.0 mm.: maxima 64.8×47.5 and 59.1×48.9 mm.; minima 55.9×47.3 mm.

I think the male of all the races of this Fish-Owl assists in incubation; it certainly does so in both the Northern forms. At other times he keeps close to the nest when the female is sitting, and often gives away the position by his deep, grumbling notes, like an old man mumbling his displeasure at something.

Incubation with the Northern race takes five weeks approximately, a period probably applicable to all the races.

(1653) *Ketupa zeylonensis hardwickii* Gray.

THE NORTHERN BROWN FISH-OWL.

Ketupa zeylonensis hardwickii, Fauna B. I., Birds, 2nd ed. vol iv, p. 408.

With the exception of Sind and Baluchistan, this race of Fish-Owl occurs over the whole of Northern India as far East as Western Bengal. In the Himalayas it extends East to Sikkim, Bhutan and possibly to the hills of Assam North of the Brahmapootra.

It frequents the same sort of country as the preceding bird and ascends the Outer Himalayas to about 3,000 feet. There is little about its nidification one can note which has not been already recorded for the Ceylon bird; Marshall states that it returns yearly to the same nesting site. A pair that bred in "Saharunpore, in a hollow in a fork of a Banyan-tree about 25 feet from the ground," in 1866 on the 10th April had two young, on the 17th March, 1867, two young ones, and on the 24th February, 1868, two eggs. Brooks found a pair breeding in a small cave near Etawah, apparently a not unusual site for this race in the hilly country.

Primrose found this Owl breeding near Longview Estate below Kurseong at an elevation of 4,000 feet, unusually high, and I have no other record of its breeding at similar elevations anywhere else.

The breeding season is roughly December to March, most eggs being laid in January and February.

The full clutch is two eggs, often one only, and I have never heard of three.

I have only got measurements of seven eggs, which vary between 58.3×47.0 and 62.3×48.7 mm., but a larger series would certainly give a wider range and, one expects, larger average measurements than for the eggs of the smaller Southern form.

(1654) *Ketupa zeylonensis* leschenault Temm.

THE BENGAL BROWN FISH-OWL.

Ketupa zeylonensis leschenault, Fauna B. I., Birds, 2nd ed. vol. iv, p. 409.

The breeding range of this Owl extends from Bengal and Orissa, through Assam, Manipur and all Burma, to the Malay Peninsula.

So far as is known the eggs of this race of Fish-Owl are laid in places very similar to those selected by the other races. In Bagoolah, 60 miles from Calcutta, Parker obtained two fresh eggs from a Vulture's nest built on the top of a lofty Popul-tree. Cripps in Faridpore found its eggs in a large hollow in a dead stump of a Mango-tree. Oates in Pegu found two young birds in a hollow between the great branches of a tree at about 10 feet from the ground, while Hopwood took two eggs from a hole in a cliff on the Lower Chindwin.

Round about Dacca a favourite nesting site was in the small ruined mausoleums, of which there were many round the race-course and golf-course and also round the Nawab's Palace. Under the domes of these were generally a stone roof over the room below, and here the birds deposited their eggs, finding their way in and out through the breaches in the masonry. The birds seemed to select those over which some parasitic *Ficus* was growing, and I found no nests in the mausoleums, equally broken down, over which no vegetation grew.

The breeding season generally is from November to February, but they sometimes breed a good deal later, the fresh eggs found by Hopwood being taken on the 2nd April.

Two eggs form the normal clutch, but I found three eggs twice in Dacca.

Ten eggs average 58.4×48.0 mm.: maxima 60.2×50.1 and 58.0×53.0 mm.; minima 56.7×47.8 and 59.9×47.5 mm.

The birds return each breeding season to the same nesting site for many years in succession, as I found great piles of pellets and animal remains in some of the nesting places I saw in Dacca. The birds sat close, but never attempted any defence of their eggs or young.

(1656) *Ketupa ketupu* Horsf.

THE MALAY FISH-OWL.

Ketupa ketupu, Fauna B. I., Birds, 2nd ed. vol. iv, p. 410.

The Malay Fish-Owl has a wide range. It occurs in the hills of Assam South of the Brahmapootra, while Coltart also obtained a specimen in Dibrugarh. Thence it ranges through Arakan and Tenasserim to the Malay Peninsula, Siam and Cochin China. It is also found in Sumatra, Java and Borneo.

The breeding habits of this species of Fish-Owl do not differ from those of the preceding, though very little has been recorded about them. So far as I have seen it is a forest bird, by preference keeping close to streams or pools, though wandering into the open pretty frequently.

I found eggs of this bird laid on the ground in the banks of steep and rocky ravines running through forest, both damp evergreen and very dry Pine-forest. There was no nest of any description, the eggs lying on the earth itself or raised above it by the numerous pellets from the food given to the young of previous broods. In each case protection from above was afforded by an overhanging boulder or rock, in some instances these being overgrown with long hanging moss or other vegetation which formed a further screen. Occasionally the eggs were placed in hollows formed in between the lowest boughs of great forest trees, and here also there was no nest other than the remains of pellets and food.

In the foot-hills of the ranges near Perak Kellow obtained quite a number of nests in forests on the borders of streams. The eggs were laid either in small caves or in holes and hollows of big trees. In Tenasserim Bingham obtained a single egg from a natural depression in a tree where a big branch forked off from the trunk.

The breeding season is December to March, most eggs being laid in January.

On one occasion Kellow obtained three eggs in a clutch, but two is the usual number. They are indistinguishable from other eggs of large Owls.

Twelve eggs average 54.6×43.7 mm. : maxima 58.1×44.0 and 53.6×44.6 mm. ; minima 51.2×43.1 mm.

(1657) *Ketupa flavipes* (Hodgs.).

THE TAWNY FISH-OWL.

Ketupa flavipes, Fauna B. I., Birds, 2nd ed. vol iv, p. 411.

This grand Owl extends from Kashmir to Eastern Assam, both North and South of the Brahmapootra. It also occurs in the Lushai Hills and from Manipur to Western China.

I can find no record of this bird's breeding other than what I have noted from time to time in my own Catalogue. In North Cachar it was found only in deep forest, though nearly always haunting the banks of streams and, so far as I can remember, I never found it out of deep forest except once, when I disturbed a pair eating a Pheasant in park-land, where many great Oaks grew closely together.

Of the few eggs I found most were laid in the old nests of Fish-Eagles, often at a great height from the ground. Occasionally,

however, it does lay its eggs in a small hollow in a ravine or river-bank. When it takes possession of an Eagle's nest it makes no attempt to repair it or to furnish a new lining, so that often it becomes very dilapidated and, one would think, insecure. The birds sit very close, and sometimes the female is so determined and fierce in her resistance that there is no alternative to shooting her on the nest before taking the eggs. The birds seem quite different in character to the Malay Fish-Owl which, though it fights desperately if wounded, offers no defence of its home. The Tawny Fish-Owl, on the contrary, attacks savagely, and is certainly far more dangerous to rob than most Eagles or Falcons.

The breeding season is in December, January and February, and the number of eggs laid is two or, occasionally, only one.

They only differ from those of the preceding species in being larger and proportionately broader, though this latter difference would probably disappear in a larger series. Ten eggs average 57.1×46.9 mm. : maxima 61.2×50.0 mm. ; minima 54.8×43.7 mm.

I have shot a male once on its nest, so it is certain he sometimes incubates, but, as a rule, he is to be found perched on a branch quite close to his mate on the nest, keeping up an intermittent deep guttural conversation. The male is not nearly so courageous and fierce as his wife with human beings, and invariably quietly makes off as the tree is being climbed.

Bubo bubo.

THE GREAT HORNED OWL.

(1658) **Bubo bubo tureomanus** (Eversm.).

THE TURKESTAN GREAT HORNED OWL.

Bubo bubo tureomanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 413.

This Horned Owl is the form breeding from Transcaspia to Persia and Baluchistan, and occurs and is resident in Gilgit and Northern Kashmir.

There is practically nothing on record about its habits and its nidification, but a young friend of mine when on a shooting expedition in Gilgit obtained two eggs which he said were those of *Bubo bengalensis*, a bird he knew well, though the eggs must be almost certainly those of the present race.

The two eggs were said to have been laid on the bare earth in a hole between two rocks on a rocky hillside at an elevation of about 8,000 feet. They measure 58.9×47.3 and 58.0×48.5 mm. They are far larger than the eggs of *B. b. bengalensis* found in the plains, but not larger than some Kashmir-taken eggs supposed, or in some instances certainly, of that race. They were taken on the 2nd March.

(1059) *Bubo bubo tibetanus* Bianchi.

THE TIBETAN GREAT HORNED OWL.

Bubo bubo tibetanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 414.

The present race of Horned Owl is a resident breeding bird in Sikkim, Tibet and Western China.

This is a rare or, perhaps, a seldom seen bird frequenting open rocky plateaus and mountains at great heights. Ludlow records seeing it twice near Gyantse, once in Summer in a deep rocky gorge and once in Winter on a telegraph-post near the British fort. It is almost certain that this is also the race seen by Osmaston in Ladak up to 15,000 feet. One he saw in an old ruined fort at Basgu, 10,800 feet, and a pair at Wimmu Nud at 14,000, while he saw traces and pellets of the Owls at Puga in June, at 14,500 feet.

There is nothing known as to its breeding except my own note in the 'Fauna.' This refers to two eggs taken by Macdonald in the first week of March 1919 at Gyantse, the elevation being 12,500 feet or more. They were said to have been taken from a small cave or hole at the foot of a high cliff leading down to a ravine, the ground bare and nearly all boulders and rocks. The eggs were laid on the ground with no sign of a nest, while in answer to a query from me Mr. Macdonald said he did not remember seeing any pellets with the eggs.

They measure 62.0×47.9 and 59.5×48.0 mm.

(1660) *Bubo bubo bengalensis* (Frankl.).

THE INDIAN GREAT HORNED OWL.

Bubo bubo bengalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 414.

The extraordinary difference in the size of eggs laid by plains birds and, on the other hand, by birds of the hills points to the conclusion that there must be two races, a larger hill bird and a smaller plains bird. To prove this skins of more breeding specimens of these Owls are necessary, and so for the present I unite them all under the one name of *bengalensis*. If the hill bird is proved to be distinct it would bear the name of *cavearius* of Hodgson.

The Indian Horned Owl is found over practically the whole of Northern India, being found in the Himalayas commonly up to 5,000 feet and less often up to 8,000, whence it extends South to Khandesh, in the Bombay Presidency, the Deccan in the West, and to Orissa. East it is found in Assam, Manipur and North-West Burma (Arakan). It occurs in Sind and Rajputana, but is not common in the more desert countries.

This race of the Horned Owl often frequents comparatively open dry areas, without much in the way of trees and vegetation, but it is also found, though in smaller numbers, in damper well-wooded districts. Thus in Bihar it is very common, but in the adjoining and wetter province of Bengal much less so.

Unlike the other great Owls, which have so great a variety of breeding places, this bird is very constant to one type, almost, if not quite, invariably laying its eggs in small caves of some sort. When not making use of a cave the birds deposit their eggs on the ground under the shelter of a tree, bank or bush and sometime without any shelter at all, while occasionally they make use of a deserted nest of a Vulture. Undoubtedly the favorite situation is in a small cave or recess in the high clay banks of rivers and streams and, next to these, caves in the rocky banks of ravines. They are generally small and shallow, while often they consist merely of a rock overhanging the bank, and sometimes they are just ledges with no protection above. Marshall (G.), who found many nests, once saw eggs which had been deposited on bare level ground, but "on every other occasion on a ledge, in a perpendicular bank of a ravine, generally by the canal, and without exception on the left bank facing West." This was in Saharanpore, but Hutton in the Doon, Cock at Dharamsala and Bingham at Delhi all give the same description of the nesting place. Davidson and Wenden, writing of the Deccan, say that it is common along all the brooks and rivers but that the caves selected were "facing all points of the compass."

These Owls are very common in the Jamalpar Hills, and here the nesting sites selected are invariably ledges on, or caves in, the steep mud cliffs whence Ollenbach sent me many clutches of eggs.

The breeding season is from October to March or early April, in the hills most birds laying in February and March, while in the plains most lay in December and January. Betham took a clutch of five eggs near Poona on the 18th October, and I have seen a set taken in Kashmir on the 11th April, while Marshall obtained a fresh clutch as late as the 16th April in Saharanpore.

The full clutch of eggs is three to five and I have never seen more, but Davidson and Wenden saw six eggs and also six young in nests in the Deccan.

Forty Kashmir eggs average 58.1×46.0 mm.; maxima 61.2×47.9 and 60.0×49.9 mm.; minima 54.1×44.8 mm. One hundred eggs from the plains average 53.6×43.8 mm.; maxima 57.2×45.0 and 54.0×45.2 mm.; minima 49.0×42.0 and 51.0×40.2 mm.

Bubo coromandus.

THE DUSKY HORNED OWL.

(1661) **Bubo coromandus coromandus** (Lath.).

THE INDIAN DUSKY HORNED OWL.

Bubo coromandus coromandus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 416.

This fine Owl ranges over the greater part of India. It is found from Sind and the Punjab on the West to Western Bengal and



EGGS OF *BUBO COROMANDUS COROMANDUS* IN
NEST OF *PSEUDOGYPS BENGALENSIS*,
(Bharatpur, December 1919.)

Bihar on the East. South it occurs as far as Khandesh, Mysore, the Deccan and the Carnatic. I refer all Burmese specimens to Robinson's *klossi*.

So long as the country is well wooded, with an ample supply of water, the needs of this fine Owl are satisfied.

Hume sums up their breeding habits as follows :—"As a rule they construct stick-nests in the fork of some large tree. At times they appropriate an old nest of the Tawny Eagle placed in some thick and thorny, but comparatively low, acacia-tree. In some cases the nest contains some lining of more or less green leaves, and a few feathers or a little grass. Occasionally I have found the eggs laid in the hollow of some huge stump, or in the depression at the fork of three or more large branches, with no stick-nest and only a few dry leaves as a bed ; but out of more than thirty nests I found one December in trees along the banks of the canal near Hansee and Hissar, all but one were regular stick structures."

There is little one can add to the above, but the great majority of eggs found by myself or my correspondents have been in deserted nests of Eagles or Vultures taken possession of by the Owls and then often repaired, lined and frequently added to by them. The birds return year after year for many seasons to the same nest, and each year they add something to the structure, so that in time it becomes very big. Cripps says of one nest found by him in a Tamarind-tree in Faridpore : "It was a huge structure of sticks and twigs, more than a man could carry."

Butler says of one nest taken by him in Sind, "It consisted of ordinary sticks like an old Kite's nest," while Ticehurst (Ibis, 1923, p. 237) quotes Bell to the effect that "eagles' or vultures' nests are those usually appropriated."

The breeding season lasts from December to March, most eggs being laid in December and January. Taylor, however, obtained a single hard-set egg of this Owl in April at Munzeerabad in Mysore.

Two eggs is the normal clutch, but Hume once found three, while, on the other hand, one only is sometimes laid. There is often an interval of several days between the deposition of the two eggs and, as the females commence incubation when the first is laid, there may be a startling difference between the size and ages of the two young birds when hatched.

One hundred eggs measured by Hume average 59.1×48.0 mm., while forty measured by myself average 59.3×48.2 mm. : maxima 62.4×49.0 and 58.1×49.2 mm. ; minima 57.0×46.3 and 58.1×45.0 mm.

In Hume's 'Nests and Eggs' a clutch of "well-marked eggs" is recorded by A. A. Anderson, who shot the bird off its eggs. "The markings consist of lilac blotches, showing through the shell, as it were, and of course, a pure white ground ; and they are both

profusely though minutely spotted, especially at the extreme end, with brown and lilac spots (or rather specks) of various shades."

The eggs are normally quite typical, though their range in size and shape is greater than is usual in Owls' eggs.

(1663) *Huhua nipalensis* Hodgs.

THE FOREST EAGLE-OWL.

Huhua nipalensis, Fauna B. I., Birds, 2nd ed. vol. iv, p. 418.

This, the finest of all our Indian Owls, is found in the Himalayas from Kuman to Assam and thence through the hill regions of North and Central Burma. It also occurs and is common in Travancore and ranges from the Nilgiris and Malabar to Ceylon.

This Eagle-Owl is essentially a forest-bird but nearly always keeps to the sides of streams, sometimes of considerable size and forming wide open spaces. I have seen it in North Cachar in very deep humid forest from the foot-hills up to some 4,000 feet, but it is most common between 1,000 and 3,000 feet. In Travancore Stewart found it breeding in some numbers from 500 or 600 up to 3,000 feet.

It always, so far as has been ascertained, breeds in fairly dense cover, though for hunting purposes it may come out more into the open.

Nests found by myself in the Assam hills have always been either in deserted Eagles' nests or in the hollow formed by the first great boughs where they divide from the trunk of big trees, and never more than 12 or 15 feet from the ground. There is no nest, though these hollows always contain a certain amount of wind-swept rubbish, in addition to which the pellets and remains of animal-food collect, forming after a few years a great mass of evil-smelling remnants. When in Eagles' nests the birds seem to do no repairs, just accepting the nests as they are and however dilapidated.

In Travancore Stewart found nests in several positions, such as in caves or on ledges of cliffs or rocks or in holes in large trees or stumps, in most cases near, or actually on the banks of, rivers and streams.

The breeding season is generally from December to February, but in Kuman Whympier found an egg on the 15th March, while I took one on the 20th June in North Cachar. This probably was a second egg laid after the first had been hatched and the young come to grief. The egg was very hard-set and must have been laid in May.

Neither Stewart, Whympier nor I have ever found more than one egg or young bird.

The eggs are quite typical Owls' eggs, and ten of them average 61.2×49.9 mm.: maxima 65.0×52.4 mm.; minima 57.0×48.5 mm.

The birds are extraordinarily savage and fight desperately for young or eggs. Even the male will join in the fight, and I have seen him attack fiercely on one occasion when his nest was being rifled after his wife had been shot.

I believe the female only incubates, but the male sits close to her, uttering his deep guttural mumble from time to time.

Huhua orientalis (Horsf.).

THE JAVAN EAGLE-OWL.

(1664) **Huhua orientalis sumatrana** Raffles.

THE MALAY EAGLE-OWL.

Huhua orientalis sumatrana, Fauna B. I., Birds, 2nd ed. vol. iv, p. 419.

Although this Eagle-Owl must be common in parts of the Malay Peninsula, there is absolutely nothing on record about its habits or its nidification.

It is a forest-bird, and in the years 1910-12 I had several skins sent to me with eggs which had been taken in the hill-ranges next to Perak, Simpang and, again, Selangor. The eggs were all said to have been found laid on the bare ground in small caves and crevices, or on ledges, in low cliffs in the foot-hills, or the broken ground and in heavy forest. Exact details of the places where the eggs were taken were not given and, in some cases, "near" Simpang or "near" Selangor might have meant a considerable number of miles away.

The eggs were all taken between the 16th December and 16th February and the clutches numbered two or three.

Twelve eggs average 53.5×43.9 mm.: maxima 56.8×45.0 and 55.3×45.6 mm.; minima 50.0×43.1 and 56.0×42.2 mm.

Otus bakkamœna.

THE COLLARED SCOOPS OWL.

(1666) **Otus bakkamœna bakkamœna** Pennant.

THE CEYLON COLLARED SCOOPS OWL.

Otus bakkamœna bakkamœna, Fauna B. I., Birds, 2nd ed. vol. iv, p. 422.

The Ceylon Collared Scops Owl is found in Ceylon and in Southern India as far North as the South Konkan and Madras.

All the various races of this Scops Owl are birds which frequent well-wooded country in the plains but do not enter dense humid forest. They prefer orchards, clumps and avenues of trees round about villages and cultivation and, according to Bourdillon, in

Travancore are very common in gardens. In the Nilgiris and hills of Southern India it occurs as high as 4,000 feet in the breeding season, but in Travancore Bourdillon says that it is most common in the plains and foot-hills, and it has only been recorded up to some 2,000 feet. In Ceylon it is found as high as 5,000 feet. No race of Collared Scops Owl, even *deserticolor*, will be found in truly desert country, as they all require a good water-supply and trees with dense foliage in which to hide.

Bourdillon records that in Travancore this little Owl often breeds in the roofs of houses, both empty and deserted, or in holes in walls of old buildings, but elsewhere they seem always to lay their eggs in natural hollows in trees. A very favourite situation in Ceylon and the Indian Tea and Rubber districts is a hole in a tree on the edge of the plantations.

Legge found a nest "placed in the hollow between the frond and the trunk of a Kitool palm (*Caryota urens*)," and he adds, "a few leaves or grass-stalks usually line the hole in which the eggs are deposited." I have no other record of any real lining being made. All the eggs Phillips found were deposited on the bare wood, which was in some instances quite rotten and crumbled. Vidal also says of the six nests found by him: "None of the nests contained any lining but rotten touch-wood." All these six nests were in holes in Mango-trees or Jack-trees, and they were all taken in the Ratnagiri district.

The birds select holes in trees which are as a rule low down, anything between 6 and 20 feet, but occasionally they choose one very high up.

The breeding season is principally January and February but, in Ceylon, Phillips obtained several nests in March and April. Davidson also took one clutch in the Konkan on the 16th April, while, on the other hand, odd clutches have been taken in December.

The usual full clutch is two or three, and Vidal found three to be the maximum number in Ratnagiri, but in Travancore Bourdillon obtained clutches of four and five eggs.

The eggs are quite typical Owls' eggs in every way, often extremely broad ovals, almost spherical.

Twenty-seven eggs average 31.8×27.0 mm.: maxima 35.0×28.2 and 33.0×29.2 mm.; minima 29.1×25.5 and 30.5×25.3 mm.

(1667) *Otus bakkamæna marathæ* Ticehurst.

THE CENTRAL INDIAN COLLARED SCOPS OWL.

Otus bakkamæna marathæ, Fauna B. I., Birds, 2nd ed. vol. iv, p. 424.

Ticehurst restricts this race of Collared Owl to the area from the Central Provinces to Sambalpur and Manbhum in Western Bengal.

Hume records either having taken or had sent to him specimens of birds and eggs both from Sambalpur and from Saugur but, of course, with the exception of *malabaricus* (=true *bakkamæna*),

all his races are lumped together. I have no eggs from the area of this subspecies, but eggs taken by Hume and now in the British Museum were taken from January to April.

Four eggs average 33.0×27.9 mm.

(1668) *Otus bakkamœna gangeticus* Ticehurst.

THE UNITED PROVINCES COLLARED SCOPS OWL.

Otus bakkamœna gangeticus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 425.

The range given for this race by Ticehurst is Rajputana and United Provinces, and to this I would add Bihar, the birds of which appear to be nearest this form.

The breeding habits are just the same as those of other races and need no repetition. It is a very common bird in Bihar, where Coltart and Inglis took very fine series of its eggs, giving me a representative set of five clutches. Nine times out of ten it deposits its eggs in holes in Mango-trees in orchards round about villages, and may often be found breeding in company with the Ringed Paroquet; I have myself found *Sitta castaneiventris*, the Owl and the Paroquet all breeding in the same Mango-tree within a few feet of one another.

Occasionally this Owl makes use of holes in old factory walls and roofs, but I have never heard of it breeding in inhabited buildings.

The breeding season is from February to April, but Coltart took a clutch of fresh eggs on the 15th May, possibly a second brood, though this Owl is not normally double-brooded.

The full clutch is three or four eggs, but five are occasionally laid.

Fifty eggs average 33.1×28.1 mm.; maxima 35.2×28.9 and 35.1×29.9 mm.; minima 31.0×27.0 mm.

Like those of most Owls, the eggs appear to be deposited at very irregular intervals, so that it is rather hard to determine the exact time taken for incubation. Sometimes the female begins to sit directly the first egg is laid, but at other times not until two or more have been deposited. Probably the time of incubation is twenty-two to twenty-three days, not more, though Witherby gives the period of incubation of the European Scops Owl as twenty-four to twenty-five days.

(1669) *Otus bakkamœna plumipes* Hume.

THE PUNJAB COLLARED SCOPS OWL.

Otus bakkamœna plumipes, Fauna B. I., Birds, 2nd ed. vol. iv, p. 425.

The plume-footed Scops Owl is found in the North-West Himalayas from Murree to Garhwal.

This bird is rather more of a forest-haunter than the other races, but does not differ otherwise in its habits. It ascends up to some 7,000 feet.

All the eggs of which I have information were taken from holes in trees. About Simla Dodsworth found it breeding in April and May, while in Kuman Whympers took two clutches of eggs, both very hard-set, on the 24th and 25th April, at an elevation of about 4,500 feet. Dodsworth's eggs were taken at about 7,000 feet in Deodar-forest. Currie found this species breeding near Lahore and took two clutches of eggs in March.

Three to five eggs are laid.

Hume's measurements for his eggs are about 32.2×28.0 mm., but twelve eggs which I have received from Murree, Simla and Kuman average 28.4×23.7 mm. : maxima 30.1×24.8 and 29.3×25.0 mm. ; minima 27.3×23.1 and 28.3×23.0 mm.

A larger series would probably increase the average size considerably, as both the clutches taken by Whympers are small.

(1670) *Otus bakkamœna deserticolor* Ticehurst.

THE SIND COLLARED SCOPS OWL.

Otus bakkamœna deserticolor, Fauna B. I., Birds, 2nd ed. vol. iv, p. 426.

This pale race is, as one would expect, confined to the arid countries of Sind and Baluchistan. A specimen from the Rajputana desert country is quite similar. Ticehurst writes about it (Ibis, 1923, p. 238):—"The Collared Scops Owl in the thicker forests of Sind is fairly common, according to Mr. Bell. Both these species, however, may well escape observation, as in the daytime they hide up in thick-foliaged trees."

Bell found a nest on the 13th March in the bottom of the foundation of a deserted Neophron's nest containing two young ones. Butler found a nest 40 feet up in a tree at Hyderabad, Sind, on the 10th April, from which a young bird had fallen to the ground below.

The only other record of its eggs being taken is that of Harrington-Bulkly, who took four eggs on the 1st March. The eggs are numbered and dated in his handwriting, and among his notes, which came into my possession, was the following, dated 18. 3. 90:—"The only good eggs this month are the Scops' eggs from the Pabb Hills."

These eggs measure 34.0×26.6 , 32.5×28.0 , 32.1×27.3 and 32.0×27.0 mm.

(1671) *Otus bakkamœna lettia* (Hodgs.).

THE BURMESE COLLARED SCOPS OWL.

Otus bakkamœna lettia, Fauna B. I., Birds, 2nd ed. vol. iv, p. 427.

This little Scops Owl is found in the Himalayas from Kuman and Nepal to Eastern and Southern Assam. It is common in the Hill Tracts of Eastern Bengal and occurs over all the hill-ranges of Burma and in South peninsular Siam.

It is a forest Owlet and, in Assam, we found it kept almost exclusively to evergreen forest at all heights from the foot-hills up to 7,000 feet, occasionally also breeding in the plains. In the Himalayas it ascends as high as 8,000 feet, perhaps higher still.

I took many clutches of this bird's eggs in the Cachar and Khasia Hills and also in Dibrugarh, in nearly every case these being deposited in holes in trees. Generally the holes were natural ones in dead trees and stumps, 5 to 15 feet from the ground, but on one occasion in Lakhimpur I found it breeding in a deserted Woodpecker's hole about 30 feet from the ground. There is, of course, no nest.

In Pegu Oates found the birds breeding in the same sort of places but, occasionally, they select very curious sites. One pair of birds I found had made use of a hole in the base of a nest of some Eagle, probably *I. nana plumbea*. The nest was a very old disused one and in the base was a hole of some size, probably made by a squirrel or some other agent, and filled with grass. I saw the Owl come out and shot it and, upon further investigation, discovered five hard-set eggs.

Hume also had eggs sent to him which were taken "out of a narrow cleft (completely hidden by a small drooping shrub) in an overhanging precipice, in the valley of the Surjon, between Petoragurh and Almora in Kumaon. They were described as laid on a few small sticks, amongst which a few feathers were interspersed."

In Assam all the eggs I found were laid in February, March and April, while in Burma Oates and Hopwood also obtained eggs in these months. The eggs sent to Hume were taken on the 22nd May.

Three or four eggs form the normal complete clutch, but I have twice seen five.

Thirty-four eggs average 32.3×28.1 mm.: maxima 34.0×29.5 and 33.3×29.9 mm.; minima 29.2×27.0 and 30.1×26.4 mm.

I have once shot the male off the eggs and once trapped him on them so, presumably, he takes his share in the incubation. They are game little birds and fight pluckily in defence of their eggs and, when handled, strike and hold with their claws almost as much as with their bills, a characteristic of all Owls.

Otus spilocephalus.

THE SPOTTED SCOPS OWL.

(1672) *Otus spilocephalus spilocephalus* (Blyth).

THE EASTERN SPOTTED SCOPS OWL.

Otus spilocephalus spilocephalus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 427

This little Owl is found from Nepal and Sikkim East to Assam, both North and South of the Brahmapootra, the Hill Tracts of Eastern Bengal and the Chin Hills. Fea obtained it in Karenni and it probably occurs throughout the hill-ranges of Northern Burma.

Like most other Scops Owls, it lives and breeds in deep forest, though it may hunt in the open. I, however, sometimes found it in mixed bamboo- and tree-jungle and also in the thick secondary growth in deserted cultivation.

The birds breed from the plains and foot-hills up to 6,000 feet, but do not wander far from the ranges. They are most often met with between 2,000 and 5,000 feet.

All the nests Coltart and I found in Assam were in holes in trees in forest or jungle, as above described, but one was in a hollow of a big Oak-tree just outside dense Oak- and Rhododendron-forest. Another, taken for me, was in a hole in a fallen dead tree in a strip of cultivation in forest. The eggs are laid in natural holes or in those of Grackles, Woodpeckers and Barbets at any height from the ground between 5 and 25 feet, and one clutch of eggs I found was laid in a hollow made by three branches of a gnarled old Rhododendron twisting round one another. The nest in the fallen tree was within 2 feet of the ground. No lining is made and, when grass, leaves etc. are found in the holes, they are invariably wind-blown or placed there by other birds.

This Owl seems to breed later than other Scops Owls, as I have taken eggs from April to June, though the latter month is rather exceptional.

The eggs number three or four and rarely five or two, and are quite typical of the genus.

Thirty-six eggs average 32.5×28.2 mm.: maxima 34.1×27.0 and 33.0×28.6 mm.; minima 31.1×27.0 and 32.3×26.0 mm.

Coltart once caught a male on the nest and one of my men also did so, but in other instances we trapped or shot females only.

It is difficult to tell the incubation period of birds which lay their eggs at erratic intervals, but I think it is twenty-one to twenty-three days and more probably twenty-one only.

(1673) *Otus spilocephalus huttoni* (Hume).

THE WESTERN SPOTTED SCOPS OWL.

Otus spilocephalus huttoni, Fanna B. I., Birds, 2nd ed. vol. iv, p. 429.

This race of Spotted Scops Owl takes the place of the typical form in the Himalayas from Murree to the Simla States and Garhwal, being most common in forest between 3,000 and 4,000 feet, but breeding both higher and considerably lower than at these elevations.

In its breeding habits this Owl differs in no way from the preceding, but it appears often to lay only two or three eggs. In Hume's time the eggs had been taken by himself (Kotegurh), Hutton (Mussoorie) and Marshall (Murree), and in each case two eggs had been laid except in the nest found by Hume, in which there were five. In my own collection I have eggs taken by W. E. Brooks,

Rattray, Dodsworth, Nurse and Whympers, all threes or twos, and in some instances much incubated.

The eggs are laid from March to June, the latter month probably being exceptional.

Twenty eggs average 31.9×27.6 mm.: maxima 34.9×28.4 and 31.0×28.8 mm.; minima 30.0×27.0 and 32.0×26.1 mm.

(1674) *Otus balli* (Hume).

THE ANDAMAN SCOPS OWL.

Otus balli, Fauna B. I., Birds, 2nd ed. vol. iv, p. 429.

This Scops Owl is found only in the Andamans.

It does not seem to keep so closely to jungle as do most of the Scops Owls. Osmaston (Journ. Bomb. Nat. Hist. Soc. vol. xvii, p. 487, 1906) says "This Owl is common everywhere"; Wickham says that it breeds freely in the roadside avenues in the settlement of Port Blair and also in the jungle round about. Butler also remarks (*ibid.* vol. xii, p. 570, 1899) that it has a habit of coming into houses and that he caught two specimens in his own bungalow.

They lay their eggs either in natural hollows or in deserted nest-holes of Woodpeckers and Barbets, usually between 5 and 15 feet from the ground, but on one occasion 35 feet up in a Padouk-tree in an avenue.

The breeding season is from the middle of February to the middle of April. The earliest date recorded is the 20th February (Osmaston) and the latest 7th April (Wickham) and 14th April (Osmaston), when a single fresh egg was taken.

Two or three eggs are laid, generally the former number. Twenty average 30.5×27.1 mm.: maxima 32.9×28.1 mm.; minima 29.1×27.5 and 30.2×24.3 mm.

The birds sit very close and are difficult to drive from their nesting sites. Osmaston (*loc. cit.*) notes:—"I found a nest in a Padouk-tree with a single fresh egg, the bird being captured on the nest. I let her go at a distance of two miles from her nest and on another island. About 3 weeks later on re-visiting the nest-hole I found it occupied again by another (or the same) Owl with two fresh eggs."

(1675) *Otus sagittatus* (Cassin).

THE LARGE MALAY SCOPS OWL.

Otus sagittatus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 430.

The Large Malay Scops Owl is found in Tenasserim, the Malay States and in South-West and peninsular Siam.

According to Davison this Owl is confined to forest-country in and near the foot-hills of the various ranges, but Herbert found it comparatively common in the fruit-gardens and open, but well-wooded, country round both Samkok and Bangkok.

In the Malay States Kellow took several clutches of its eggs, and these also were laid in holes in trees in well-wooded but not forest areas.

All the nests recorded by Kellow or Herbert have been in natural hollows of trees at heights between 10 and 20 feet from the ground, and they are, like the eggs of other Scops Owls, deposited on the bare wood without a lining of any kind.

So far as we know the breeding season is in February and March, and of five clutches and a single egg recorded the earliest date is 2. 2. 10 and the latest 29. 3. 10, both taken by Kellow.

Of the five clutches one was a four, the rest all of three eggs.

Seventeen eggs average 34.2×28.5 mm.: maxima 37.6×29.0 and 34.5×29.2 mm.; minima 32.2×27.7 mm.

(1676) *Otus brucei* (Hume).

THE STRIATED SCOPS OWL.

Otus brucei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 431.

The Striated Scops Owl has a wide breeding range, being found from Palestine and Transcaspia to Persia, Baluchistan and Afghanistan. The only record of its breeding in India is given by Williams (Journ. Bomb. Nat. Hist. Soc. vol. xxxiii, p. 608, 1929):—"Fairly common in certain localities round Quetta. On the 16th April, 1925, I flushed a bird out of a hole in a 'Sticky Plum' tree in the Mian-gandi Reserve Forest. On enlarging the hole I found one egg. In the meanwhile the bird sat close by and, when shot, an egg was extracted from the oviduct. The bird has been identified and is now in the MacMahon Museum.

"The egg was laid on a few rotting chips and no proper nest was made. The egg taken from the nest was slightly glossy, but the one out of the oviduct was chalky. They measure 32.4×27.8 mm."

A large series of forty eggs from Persia average 31.1×27.3 mm.: maxima 33.0×26.3 and 31.7×28.1 mm.; minima 29.0×26.0 and 30.3×25.8 mm.

Otus scops (Linn.).

THE ITALIAN SCOPS OWL.

(1677) *Otus scops pulchellus* (Pall.).

THE EASTERN SCOPS OWL.

Otus scops pulchellus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 433.

This form of Scops Owl is found from South Russia to Aden, Palestine, Persia, Afghanistan and Baluchistan.

It has never yet been proved to breed in this country, but Ticehurst says that it certainly breeds near Quetta, at Ziarat, in the Juniper-forests.

Otus sunia.**THE INDIAN SCOPS OWL.**(1680) **Otus sunia sunia** (Hodgs.).**THE NORTHERN INDIAN SCOPS OWL.***Otus sunia sunia*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 435.

The range of this Owl is all along the Outer Himalayas from Hazara to Eastern Assam, North of the Brahmapootra. Field found it breeding in Gya, and it undoubtedly breeds in the plains of the Punjab, United Provinces and Bihar, and occurs, and is probably resident, in the Central Provinces.

In the daytime they keep to forest, orchards or trees in open country which have very dense foliage in which to hide. They occur all over the plains and in the hills up to some 6,000 feet or more.

The only note on its nidification in Hume's 'Nests and Eggs' is that of Thompson, who says:—"They breed from March to August, in holes of trees, usually at no great height from the ground. It is a common bird in our forests (Garhwal). Several pairs used to breed in the Botanical Gardens at Saharanpore. A pair has been breeding for three seasons in a small tree in front of the forest-bungalow at Kotidwara. Four years ago a young one was brought to me in the month of July."

In North Assam we found it breeding in thin evergreen forest on the rocky and precipitous banks of the Subansiri River. The eggs, four in number, were laid in a large hollow in a dead stump of a tree about 7 feet above the ground. The bird flew from the tree as we passed, but immediately returned and was caught by hand on the nest.

Field told me that a clutch of eggs taken by him were laid in a hole in among the stones of a wall of one of the famous ruined temples of Gya.

Buchanan obtained eggs in Murree on the 12th February and Field in Gya on the 27th March. The breeding season seems, therefore, to be February to April. Only three or four eggs have been taken in a clutch, but it is sure to lay five sometimes, as does *modestus*.

The ten eggs I have measured average 32.8×27.0 mm. : maxima 34.8×26.5 and 32.0×28.0 mm. ; minima 30.1×26.1 mm.

The young birds when molested behave just like all other young Scops Owls, hissing and growling alternately and striking at the offending hand with their feet.

During the breeding season both sexes fly quickly into the air off some elevated perch and then fly round in circles with wings stiffly extended, both birds being sometimes in the air together, squawking softly in a note I have heard at no other time.

(1681) *Otus sunia modestus* (Walden).

THE BURMESE SCOPS OWL.

Otus sunia modestus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 437.

Specimens of this bird obtained in the Cachar and Khasia Hills, South of the Brahmapootra, are of this race. From this district they extend throughout Burma as far South as North Tenasserim and again East through Siam, the Shan States and Cambodia. They are also found in the Andamans and Nicobars.

The habits of this race are the same as those of others of the genus. In the South Assam hills we found it almost always selected holes in dead or living trees in evergreen forest, but often in those on the banks of streams. One of the first I ever found was in a hole of a tree-stump leaning over the Mahor stream; climbing this, in order to cast further over a pool I was fishing, a little Owl flew out. I kept perfectly still, and in a few minutes it returned and was caught in my landing-net.

The holes selected are from 6 to 20 feet from the ground, generally natural hollows in decayed branches or trunks, but occasionally a deserted Grackle's or Woodpecker's nest-hole.

The breeding season is February to April, but I have taken eggs on the 2nd May and the 26th June, both of which were, I believe, second layings, the first having been destroyed or stolen by vermin.

The usual full clutch is three or four, but I have twice seen five young in a nest.

Thirty-three eggs average 31.6×27.0 mm.; maxima 33.1×27.2 and 31.0×28.0 mm.; minima 30.0×25.5 and 30.3×25.4 mm.

The birds are very hard to drive away from their nesting sites. One of my collectors told me that he took two clutches of this Owl's eggs, one on the 9th and the second on the 21st of April; on each occasion he caught the bird and examined her carefully, but when he released it the second time it flew straight back to the empty nest, and was there when he left.

(1682) *Otus sunia malayanus* (Hay).

THE MALAY SCOPS OWL.

Otus sunia malayanus, Fauna B. I., Birds, 2nd ed. vol. iv, p. 437.

This race is found from Tenasserim and South-West peninsular Siam to Singapore.

The only eggs hitherto recorded are those described by Bingham ('Nests and Eggs,' vol. iii, p. 107) under the name of *lempiji*:—"On the 11th March a Karen, who had been marking down nests for me in the Meplay Valley, took me to a tree on the bank of the chonng, and showed me a hole in a branch of a large pyma-tree (*Lagerstræmia flos-reginæ*) in which he said a small Owl had its nest

with three eggs. On his ascending the tree a female of the above species flew out, which I shot. In ten minutes he brought me down three white, round, glossless eggs perfectly fresh, which he said were laid on the bare wood in a natural hollow in a branch. The hole was about 3 feet from the base of the branch on the underside, and about 15 to 20 feet above the ground.

"I found a second nest in the hollow of a dead Thingan-tree (*Hopea odorata*) near the bank of the Meknay stream, a feeder of the Meplay, on the 30th of the same month. The eggs four in number."

Two of the latter four are missing, the remaining five eggs average 31.6×27.9 mm.

Two eggs taken by Mackenzie on the 4th March are much larger, measuring 34.0×28.0 and 34.2×29.0 , and are probably unusually large. These eggs were hard-set and were taken from a natural hollow in a tree in forest.

Athene brama.

THE SPOTTED OWLET.

(1683) **Athene brama brama** (Temm.).

THE SOUTHERN SPOTTED OWLET.

Athene brama brama, Fauna B. I., Birds, 2nd ed. vol. iv, p. 439.

This little Owl, so well known in one form or other to every resident in India, is found over the whole of the South of the continent roughly up to about 14° latitude. This is admittedly an arbitrary division, as the Southern dark and Northern paler forms naturally run into one another at about this degree; some of the birds of the Southern Deccan and extreme South of the Bombay Presidency might also be included in this race.

This is one of the most confiding and familiar of Indian birds haunting the vicinity of towns, villages and civilization. It is a low-country bird, only ascending the Mysore and Travancore hills for some 1,000 or 1,500 feet. Every garden has its one or more pairs of these Owlets, and there can be but few Tea-garden or other bungalows which have not these birds breeding in their walls or roofs. Many individuals, of course, lay their eggs in holes in trees and, as they are too large to use Woodpeckers' and Barbets' holes, the only ones they can use are natural ones or those of the Grackles or Hill-Mynas. At the same time they have no scruples about taking the nesting sites of other birds. Hume records how they ousted a pair of Rollers from their nest under the roof of a house, while Butler relates finding two eggs of the Owl in a hole in which there was a single egg of a Paroquet and the remains of the Paroquet herself. Often I have known the northern form turn out Mynas (*A. tristis*) from their breeding places, while sometimes

they also succeed in defeating the Ringed Paroquets and usurping their nest-holes. Generally, I think, the Paroquets put up such a stout resistance that the Owls give up the fight. Another thing which helps the rightful owners is the fact that all other birds hate Owls, and often join in mobbing them when the fight for possession begins. The Southern form is perhaps more regularly a tree-nester than the Northern one, which seems to prefer inhabited houses to any other site. It does not matter much to them where they lay their eggs; holes in walls, roofs and chimneys or in the thatch are equally serviceable or, failing these, the eggs may be deposited on the ceiling-cloths used in so many of the old-fashioned houses. Many collectors speak of linings being made in the nesting-holes of these Owls, and certainly beds of leaves, grass, roots and various oddments are often found in them. At the same time I have never seen one of these Owlets carrying any material into the nest-hole, and I believe the so-called nests are those of other birds or just wind-blown scraps.

If they select holes in trees for nesting in, these are generally low down, between some 5 and 25 feet from the ground, and any hole, in any kind of tree, that is large enough for the birds to enter suffices for their purpose. Nor do they seem to mind what the tree is, though they do undoubtedly prefer those with enough foliage to provide cool deep shade during the day and, perhaps for this reason, Mango-trees growing in Mango-orchards are much liked, more especially in the North.

The breeding season is from November to March, Bourdillon having taken three fresh eggs on the 4th of the former month.

Three or four eggs are laid, and these at irregular intervals; Inglis and Fletcher ('Birds of an Indian Garden,' p. 157) say: "Incubation evidently starts as soon as the bird lays, as we have taken at the same time from one nest two highly incubated and one perfectly fresh egg"; while others, including myself, have seen young ones in the nest of greatly varying ages.

The eggs are typical Owls' eggs. Forty average 31.6×27.4 mm.; maxima 33.9×25.0 and 33.2×28.0 mm.; minima 29.3×24.4 mm.

Both sexes incubate, or perhaps it would be safer to say both sexes sleep during the daytime in the hole, though it is almost certain the male takes his share of incubation.

They sit very close, and will often allow themselves to be captured on the nest, sometimes quite quietly, at other times fighting fiercely.

(1684) *Athene brama indica* (Frank.).

THE NORTHERN SPOTTED OWLET.

Athene brama indica, Fanna B. I., Birds, 2nd ed. vol. iv, p. 440.

This race of the Spotted Owlet may be said to occur everywhere in India North of latitude 14° , from Sind in the West to Assam in the East.

What has already been said in reference to the breeding of the Southern race applies equally to this bird.

The breeding season is somewhat later than it is in the South, most eggs being laid in March and April. At Poona Betham found them laying freely in February, and Barnes also gives their breeding season in Rajpootana as February and March, while Bingham also says that in Allahabad they lay from February to March.

The full clutch is generally three or four and occasionally five.

Fifty eggs average 32.2×27.1 mm. : maxima 33.8×28.1 mm. ; minima 29.0×25.0 mm.

These little Owls are very hard to drive from their nesting sites. They sometimes become quite a nuisance in a hungalow and lay in very inconvenient spots, and no taking of eggs or young will keep them away. Adams says that in Sambhur he has once or twice shot one of a pair, but that another has taken its place within a day or two.

(1685) *Athene brama pulchra* Hume.

THE BURMESE SPOTTED OWLET.

Athene brama pulchra, Fauna B. I., Birds, 2nd ed. vol. iv, p. 440.

This subspecies is found over the whole of Central and South Burma, the Shan States, Yunnan, Siam and Cambodia.

In Siam the breeding season is February and March, but in Burma Mackenzie and Hopwood obtained eggs from the 12th March to the 16th April and Macdonald from the 7th March to the middle of July, the latter a single egg found at Pakokku.

Twenty-three eggs average 31.7×26.6 mm. : maxima 34.0×29.5 mm. (Prome); minima 30.0×25.9 and 31.0×25.5 mm. (Samkok).

(1686) *Athene blewitti* Hume.

THE FOREST SPOTTED OWLET.

Athene blewitti, Fauna B. I., Birds, 2nd ed. vol. iv, p. 441.

Of the distribution of this little Owl not much is known. It has been found in Phuljan, near Sambalpur, the Udet River in Karial, about 150 miles South of Phuljan and, finally, in Khandesh.

Nothing can be said about its habits beyond that it is a bird of deep forest.

As regards its nidification, all that is known is that in P. Mackinnon's collection there was a clutch of four eggs marked "76 quint," which is Hume's Catalogue number for this bird. These eggs were taken by Mackinnon himself on 14.3.90, and were almost certainly taken in the Sambalpur forest, where Mackinnon apparently was shooting in March and April of that year.

These eggs measure 33.0×28.0 , 34.0×27.5 , 32.8×27.0 and 32.5×26.6 mm.

Athene noctua Scop.**THE LITTLE OWL.****(1688) *Athene noctua ludlowi* Stuart Baker.****THE TIBETAN LITTLE OWL.***Athene noctua ludlowi*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 443.

So far as is recorded at present this Little Owl has only occurred in Tibet and the Mishmi Hills.

All that is known of its habits is noted by Ludlow, who writes (Ibis, 1928, p. 212) :—" This little Owl is not uncommon throughout the year at all elevations between Gyantse and Phari. It may be seen sunning itself in Winter on the walls of ruined buildings, which are so plentiful in this country."

Two eggs sent to me from Gyantse were taken from a hole under the eaves of an inhabited Tibetan house on the 9th May at an elevation of some 12,500 feet.

The two eggs measure 37.9×29.0 and 36.6×28.8 mm.

Glaucidium cuculoides*.*THE BARRED OWLET.****(1689) *Glaucidium cuculoides cuculoides* (Vigors).****THE WESTERN HIMALAYAN BARRED OWLET.***Glaucidium cuculoides cuculoides*, Fauna B. I., Birds, 2nd ed. vol. iv, p. 444.

The Western form of Barred Owlet is confined to the Himalayas from Murree and Mussoorie to Eastern Nepal.

It is a bird both of forest of all kinds and also of open well-wooded country and, so long as there are lots of trees about, I do not think it minds much where it breeds. It is common in the foothills of the Himalayas, nesting up as high as 7,000 or 8,000 feet. Rattray obtained a clutch of eggs at about the latter height near Murree and a second at 6,500 feet, Dodsworth near Simla at about 7,000 and Whympers round Naini Tal at 5,000 feet. Hutton, in Hume's time, found this Owl breeding round Mussoorie between 5,000 and 6,000 feet, while Thompson took eggs above Kharpatal in Garhwal at about 4,000 feet, where, he says, it was common in the Oak- and Fir-woods.

Any suitable tree with a fairly large natural hole in it between 10 and 30 feet from the ground may be chosen for the purpose of depositing the eggs. Cock found three nests at Dharamsala, all with four eggs or young, in holes in " hill oaks, some 20 to 30 feet from the ground. There was no lining to the nest, just a few dead

leaves that might have been in the hollow accidentally." Hill Oaks are often selected probably because the older, bigger trees so often have holes in them admirably suited for nesting purposes.

They breed from early April to May, a few birds perhaps in June, though this is exceptional. On the other hand, some must lay in the end of March, as Rattray took four hard-set eggs on the 4th April.

Thirty eggs average 35.8×30.4 mm.: maxima 38.5×31.2 and 37.1×31.4 mm.; minima 35.0×29.2 and 35.2×29.0 mm.

(1690) *Glaucidium cuculoides rufescens* Stuart Baker.

THE BURMESE BARRED OWLET.

Glaucidium cuculoides rufescens, Fauna B. I., Birds, 2nd ed. vol. iv, p. 445.

This race of the Barred Owlet extends from Sikkim East to Northern Burma, where it occurs as far South as Pegu. It is also found in the North and South Shan States.

Gammie first took the eggs of this subspecies in Sikkim at about 2,000 feet, the tree selected being one "in the middle of a thick patch of living trees." In North Cachar, the Khasia Hills and in the Lakhimpur district we took many nests, and in all three places they bred from the foot-hills up to some 6,000 feet, but most often below 4,000 feet. The site selected is one similar to that of the Western bird but often at greater heights, between 30 and 40 feet from the ground.

The breeding season is April and May, a few birds laying in early June or in late March.

The normal full clutch is four, but both three and five eggs are often to be seen.

Forty-eight eggs average 36.5×30.5 mm.: maxima 39.2×31.0 and 38.7×31.5 mm.; minima 30.3×26.4 mm. The last is practically a pigmy egg, and the next minima are 33.2×30.0 and 35.5×29.2 mm.

Both sexes incubate and sit very close, often allowing themselves to be caught on the eggs. They fight sturdily, using feet and claws, as well as beak, with which to repel an invader.

(1691) *Glaucidium cuculoides brugell* Parrot.

THE SIAM BARRED OWLET.

Glaucidium cuculoides brugell, Fauna B. I., Birds, 2nd ed. vol. iv, p. 446.

This is the Siamese form of Barred Owlet, which may extend into Eastern Burma more widely than is known. A specimen in the British Museum from Karenni seems to be certainly of this race.

Herbert found this Barred Owlet breeding freely round Samkok, depositing its eggs, three in number, in large natural hollows in big trees growing in the fruit-gardens and in other comparatively open places.

The breeding season is January and February, all Herbert's eggs being taken between the 17th January and the 7th February.

Seven eggs average 34.3×30.1 mm.: maxima 36.2×30.3 and 36.1×31.0 mm.; minima 33.9×29.0 mm.

(1692) *Glaucidium cuculoides fulvescens* Stuart Baker.

THE TENASSERIM BARRED OWLET.

Glaucidium cuculoides fulvescens, Fauna B. I., Birds, 2nd ed. vol. iv, p. 447.

This bird was named by me from specimens from Tenasserim, and its limits North, South and East have not been defined.

So far as is known, its breeding habits and haunts are similar to those of other Barred Owlets. Bingham, writing from Tenasserim, is quoted by Hume to the following effect:—"The first nest I found of this species was at Meawaddy on the 12th April; it was placed in the hollow of a small Pynkado-tree (*Xylia dolabriformis*), and contained three fresh eggs lying on a few chips of decayed wood, leaves and feathers.

"Subsequently, on the 23rd of the same month, a Karen led me to a nest-hole of this bird, placed in the hollow of the stump of a teak that had been felled years ago; this was on the Meplay chaung. In this case I secured the female alive and two fresh eggs out of four, two breaking in the scuffle with the hen. One egg was quite fresh, the other slightly sat upon.

"Again, on the 2nd May at Pinekyoon on the Hlinehoocy I found two eggs and two young ones in the hollow of a dead cocoanut-tree. No semblance of lining or nest was there, but balls of the bird's *dejecta* lay with the eggs and young ones."

The average of the measurements given by Bingham is 1.32×1.17 inches ($= 33.8 \times 29.7$ mm.).

(1693) *Glaucidium castanotum* Blyth.

THE CHESTNUT-BACKED OWLET.

Glaucidium castanotum, Fauna B. I., Birds, 2nd ed. vol. iv, p. 447.

This handsome Owlet is restricted to Ceylon, where it occurs over the greater part of the island except in the drier Northern tracts. It is found in evergreen forests at all heights from the plains up to Newara Eliya at 6,000 feet. It is not rare even round Colombo but, owing to its habits, is little known.

It is said to breed during March, April and May, laying two eggs in natural hollows in dead and living trees and palms. Wait had two eggs brought to him in the first week in March, taken from a hole in a dead tree near Rahmapoora. These measure 33.7×28.7 mm., and two eggs in the British Museum measure 35.8×29.2 and 34.0×27.4 mm.

Glaucidium radiatum.

THE JUNGLE OWLET.

(1694) ***Glaucidium radiatum radiatum* Tickell.**

THE NORTHERN JUNGLE OWLET.

Glaucidium radiatum radiatum, Fauna B. I., Birds, 2nd ed. vol. iv, p. 448.

The Northern race of Jungle Owlet is found from the Sub-Himalayas, where it occurs up to about 4,000 feet, down as far South as Khandesh in the Bombay Presidency on the West and to the mouths of the Godavery on the East. It occurs in the Nilgiris also, and Macpherson records taking its eggs in Mysore. It is not found in Sind and the Punjab, but is resident in the Arivalli Hills in Rajputana. In the Bombay Deccan and in the Western and Central Provinces it is nowhere common.

This is a Jungle Owlet and keeps to forest or thickly wooded country. Over most of its area it will be seen most often in thin deciduous forest and in orchards, but it often breeds in evergreen forest and has also, on the other hand, been found nesting in gardens. Cockburn, writing from Allababad, says: "a clutch of three eggs of this Owl were taken by me on the 21st March out of a hole in a horseradish-tree in my garden. The bird is common in this, the old side of the Cantonments." Darling says that in Coonoor it breeds "in rather open jungle," while in the United Provinces Osmaston took eggs from trees standing "in scrub-jungle."

As a rule the birds select a natural hollow in a tree some 10 to 25 feet from the ground, and more often under than over 15 feet. Occasionally they make use of the deserted nests of Barbets or Woodpeckers.

The breeding season is April and May, sometimes March, while Harrington Bulkly took eggs as early as the 24th February.

The full clutch of eggs is three or four, but Macpherson took a single hard-set egg from a hole occupied by a pair of this species on the 22nd March.

Twenty-eight eggs average 31.5×26.8 mm.; maxima 34.2×27.3 and 31.3×27.5 mm.; minima 30.6×26.4 and 31.0×26.0 mm.

Both birds are often found together in the nesting-hole, but there is nothing on record as to whether the male really incubates.

(1695) *Glaucidium radiatum malabaricum* Sharpe.

THE MALABAR JUNGLE OWLET.

Glaucidium radiatum malabaricum, Fauna B. I., Birds, 2nd ed. vol. iv, p. 449.

This race of Jungle Owlet replaces the preceding bird in India, South of the range of the Northern race and in Ceylon.

Its breeding habits are similar to those of the Northern subspecies. Vidal says that in the South Konkan it is "rather common throughout the district in well-wooded parts. My shikara brought me two fresh eggs with the parent birds on the 14th April." "Dr. Armstrong also got a nest in March with three eggs."

Bourdillon took many nests in Travancore, as did Stewart. The former notes: "common in the low country and on the lower slopes of the hills up to 2,500 feet. It prefers the neighbourhood of forest, making its nest in holes in trees and laying two or three eggs. The nesting season is March to May."

Three seems to be the normal full clutch, though Stewart found one with four.

Thirty eggs average 30.4×26.4 mm.; maxima 32.2×26.7 and 31.3×27.7 mm.; minima 27.2×25.4 and 30.0×25.3 mm.

In Ceylon its nests and eggs do not appear to have been found.

Glaucidium brodiei.

THE PIGMY OWLET.

(1696) *Glaucidium brodiei brodiei* Burton.

THE WESTERN COLLARED PIGMY OWLET.

Glaucidium brodiei brodiei, Fauna B. I., Birds, 2nd ed. vol. iv, p. 450.

This quaint little Owlet is found in the Himalayas from Murree to the Garhwal Hills and Nepal. It is common in the Simla States between 3,000 and 7,000 feet, while Osmaston obtained it breeding at Chakrata at 8,000 feet.

Rattray found it breeding freely round Murree between 5,000 and 7,000 feet. The nest-holes were in trees in densely wooded ravines and "galis" at heights between 15 and 20 feet from the ground; no special kind of tree was selected, but perhaps more were in Oak-trees than in other species. Woodpeckers' or Barbets' deserted nesting-holes were usually taken possession of, and in one case the hole had apparently been enlarged by the little Owls. Osmaston found them breeding in similar forest of Oak and Fir, and one of the nests taken by him was about 15 feet up in an Oak-tree (*Quercus dilatata*) in a Woodpecker's nest-hole.

The principal breeding month is May, but sometimes they lay in April, for Rattray obtained fresh eggs on the 24th of that

month, and Hutton found a nest with three young and one egg on the 11th May in Murree. Thompson, who gives no locality, says that the birds breed from May to July and, finally, Marshall obtained three fully-fledged young ones on the 22nd June.

Three or four eggs are laid and occasionally five, Buchanan obtaining this number in Mussoorie and Rattray the same in Murree on the 24th April. Whymper, however, found two eggs hard-set near Naini Tal in March. They are quite typical Owls' eggs, white, round and with the usual texture and slightly glossed soapy surface.

Twenty eggs average 29.7×24.1 mm.: maxima 31.5×24.2 and 29.4×25.4 mm.; minima 28.0×23.0 mm.

(1697) *Glaucidium brodiei tubiger* (Hodgs.).

THE EASTERN COLLARED PIGMY OWLET.

Glaucidium brodiei tubiger, Fauna B. I., Birds, 2nd ed. vol. iv, p. 451.

The Eastern subspecies of Pigmy Owlet extends from Sikkim and Eastern Nepal to Assam, Manipur, the hills of Burma to Tenasserim, the Malay States, China and Formosa.

Like the last bird, this little Owl keeps very closely to dense forest, preferably to evergreen; but I have known it to select a tree for breeding purposes in a patch of cultivation or standing by itself in grass-lands on the edge of forest. Always, however, even when the nest-hole is in a bare rotten stump, there is sure to be a big tree with very dense foliage alongside in which the birds can hide when not sitting on the eggs. Often the hole selected is one high up in a tree, so thickly covered with leaves that it is impossible to see where it is, and even the bird, as it sits continually uttering its little call of four whistles, cannot be detected. Any description of hole suffices as a nest-hole. Occasionally it may be one large enough to contain a Goose and its eggs, sometimes it is a small natural hollow only a few inches across and, often, it is the deserted nesting-tunnel of a Woodpecker or Barbet. Just as the nest-hole varies so does the height at which it is placed. I have taken the eggs from a huge hole in a dead stump of a tree not 5 feet from the ground, and I have taken others from Barbet-holes 30 and 40 feet up in trees.

These little Owls, though so tiny, are very pugnacious, and will often oust Barbets and Woodpeckers, bigger and heavier than themselves, from holes they wish to secure for their own domestic purposes, occasionally killing and eating the rightful owners before taking possession.

They make no nest of any kind, but very often there is a thick mat of pellets and remains of insects under the eggs, as, like most Owls, they return each year to the same hole.

The nesting season is April and May and, more rarely, early June. A few birds lay in the end of March, and I have taken eggs as early as the 21st of March and again as late as the 2nd and 3rd July.

Like the preceding bird, the present one lays from two to five eggs, the normal number being three or four. These, as so often occurs among the Owls, are laid at irregular intervals, and in a brood of five young ones I have seen two beginning to show wing- and tail-quills, two comparatively large balls of snow-white down and the fifth a tiny powder-puff about the size of a golf-ball and yet looking ludicrously large when compared with its parents.

Twenty-five eggs average 28.0×23.5 mm.: maxima 29.1×25.2 mm.; minima 26.5×22.0 mm.

Both bird incubate or, at all events, both may be caught inside the nest-hole. They are the gamest of little birds, and refuse to leave their eggs or young until forcibly ejected, growling, hissing savagely and fighting to the last.

***Ninox scutulata* Raffles.**

THE BROWN HAWK-OWL.

(1698) ***Ninox scutulata lugubris* (Tickell).**

THE INDIAN BROWN HAWK-OWL.

Ninox scutulata lugubris, Fauna B. I., Birds, 2nd ed. vol. iv, p. 454.

This Hawk-Owl occurs in the lower Outer Himalayas from Murree (Rattray) to Western Assam, North of the Brahmapootra. South its range extends to the Bombay Presidency, the Central Provinces, Bengal and Orissa. In the Central Bombay Presidency the two forms *lugubris* and *hirsuta* meet and become intermediate.

Like other Owls of this genus, the present bird is found both in forest and in quite open country if sufficiently well wooded, and is probably resident everywhere.

Nothing is known about its nidification except that Osmaston found its eggs "in a large hole in a Mango-tree, about 8' up, in a compound in Dehra Dun."

This nest, which was found on the 1st July, contained four eggs which measured between 36.2×30.1 and 36.2×30.9 mm.

They are typical Owls' eggs in all respects.

(1699) ***Ninox scutulata burmanica* Hume.**

THE BURMESE BROWN HAWK-OWL.

Ninox scutulata burmanica, Fauna B. I., Birds, 2nd ed. vol. iv, p. 455.

The Burmese Brown Hawk-Owl ranges from Assam South of the Brahmapootra, through Burma, to Tenasserim and possibly,

according to Kloss, to the North of the Malay States. East it is found through the Shan States to North and Central Siam and, probably, South-West Siam. It is to be found from the foot-hills up to about 4,000 feet, but more often between 2,000 and 3,000 feet than higher or lower.

This is rather more of a forest-haunting bird than the Western race but, like it, may be found in almost any kind of country, and I have more than once taken its nest in trees standing absolutely in the open. Its favourite site seems to be a hole in some dead tree standing in cultivation with forest all round, or else in the half-cleared spaces round some of the Khasia villages. Other holes I have seen occupied by these Owls have been in thin forest of deciduous trees, odd trees standing in scrub- and bamboo-forest and again a few in the depths of evergreen forest but, in such cases, nearly always near some open glade or stream.

There is, of course, no nest beyond the usual pellets found in old nesting sites, and any sort of hole seems to suffice for the deposition of the eggs. Most are of some size and none are at any great height from the ground, more being under rather than over 20 feet, while I have taken eggs from as low down as 6 feet from the ground.

One nest I found had been previously occupied by a Roller (*Coracias b. affinis*), and the Owl was sitting on two eggs of its own and one of the Roller's. On the ground numerous Rollers' feathers in and below the nest raised serious suspicions, but not proof, of what had happened for, under most circumstances, these Owls are almost exclusively insectivorous.

As usual, they are good fighters in the protection of their household penates, and may easily be caught on their nests, and we have thus caught both males and females when sitting.

The breeding season is from the end of March to the first week in June, and the birds are not double-brooded.

Three to five eggs are laid, the latter number being exceptional.

Fifty eggs average 35.1×29.5 mm.: maxima 38.0×31.6 and 37.0×32.0 mm.; minima 33.1×29.3 and 34.3×28.0 mm.

An egg laid and marked in pencil on the 3rd April hatched on the 27th, so in this case we have the exact number of days, i. e., twenty-four, occupied in incubation. Both sexes assist in incubation.

(1702) *Ninox scutulata hirsuta* Temm.

THE SOUTHERN INDIAN BROWN HAWK-OWL.

Ninox scutulata hirsuta, Fauna B. I., Birds, 2nd ed. vol. iv, p. 457.

This dark race of Hawk-Owl is found in Ceylon and Travancore, while the birds of the South of the Bombay Presidency and again of South Madras are nearer to it than they are to the Northern form.

Its breeding habits, so far as they are known, are similar to those of other races, but Wait notes ('Birds of Ceylon,' 2nd ed. p. 242, 1931): "Within the last five years or so this bird has come to live in big trees in bungalow compounds in the Cinnamon Gardens, a residential quarter in Colombo. I often hear the cry at night from my house." He also writes:—"Found mainly in thick jungle, preferably on the borders of tanks, or on river-banks. It breeds from about Xmas to April, laying two or three, almost spherical, white eggs in holes in trees. A Ceylon egg measures 1.45×1.27 inches" (=about 36.8×32.2 mm.).

Bourdillon, who took three nests containing one, two and one egg respectively, says that in Travancore it is "A Forest Owl not often seen but often heard and not uncommon between 2,000 and 3,000 feet, while it is also found in the low country. It nests in holes of trees, laying two or three round white eggs, from January to May."

The above four eggs sent me by Bourdillon were taken in February, March and April, and measure 34.3×29.6 , 34.3×31.5 , 35.3×31.0 and 38.0×29.2 mm.

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